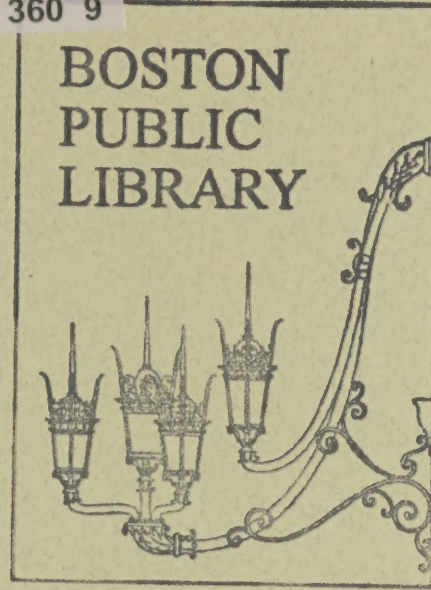
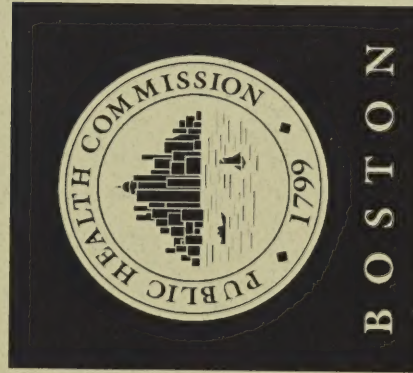
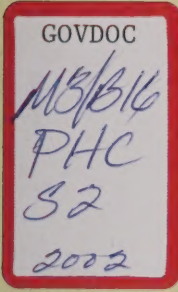


# BOSTON NATALITY 2002



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A REVIEW OF 2000 BIRTH DATA  
Prepared by the Boston Public Health Commission  
David Mulligan, Chair  
John Auerbach, Executive Director







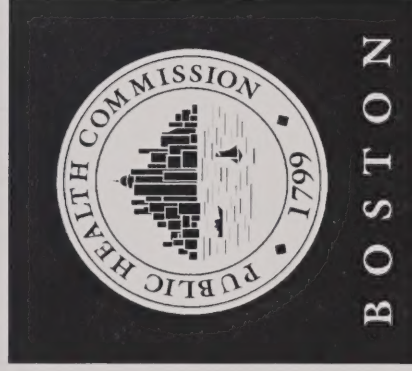
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# BOSTON NATALITY 2002



## A REVIEW OF 2000 BIRTH DATA

Prepared by the Boston Public Health Commission

David Mulligan, Chair

John Auerbach, Executive Director

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### **Suggested Citation**

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A Review of 2000 Birth Data*  
Boston Public Health Commission  
Research Office  
Boston, Massachusetts  
2003

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## HOW TO READ AND USE THIS REPORT

### **What is the purpose of this report?**

This report is produced annually to provide the mayor, city administrators, city councilors and the Boston Public Health Commission (BPHC) board, the BPHC Executive Office, and the public with an overview of issues related to Boston births. It offers a basis for identifying community needs for the purpose of making public policy and is meant to be a resource for discussion at the national, state, and local levels.

### **How is it organized?**

Overall, *Boston Natality 2002: A Review of 2000 Birth Data* provides data by birth, maternal, and infant characteristics. Several indicators from the linked birth/infant database are included. Results of significance testing for many indicators are provided. The report also contains two special sections. One special section discusses major contributors to birth outcomes based on logistic regression analysis. The second special section focuses on infant mortality and disparities by race/ethnicity. Selected maternal and infant indicators from Healthy People 2010, technical notes, and a glossary can also be found in the back of this report.

### **What time period does the report cover?**

The most recent data that could be included in for this report is from 2000, and the time period presented for trends is 1990, 1991, or 1992 through 2000. See the Technical Notes at the back of the report for details.

### **What population base does the report use?**

All Boston pregnancy-related rates were calculated using the Boston population as listed in the 2000 US census. National or state rates provided by agencies other than the BPHC Research Office may be based on other sources. The Technical Notes provide more explanation of population sources.

### **What do the statistics mean?**

The data are presented using percentages, age-specific rates, and infant mortality rates. The Technical Notes provide explanations of the rates presented, how they are used, and how they are calculated.

### **What racial and ethnic groups are included in the report, and how are they defined?**

Readers of this report should keep in mind that racial and ethnic designations are social conventions, not biological categories. See Racial and Ethnic Designations in Technical Notes for additional information.

Boston has a diverse population, but the health care field does not collect and provide detailed data on every racial and ethnic group. Data sources generally use only a few major categories for the presentation of health-related data by race and ethnicity, such as White, Black, Asian/Pacific Islander, Hispanic, and Other/Unknown. *Boston Natality 2002: A Review of 2000 Birth Data* presents Boston-specific data for non-Hispanic Whites, non-Hispanic Blacks, Asian/Pacific Islanders, and Hispanics.





# Boston Natality 2002: A Review of 2000 Birth Data

## Highlights

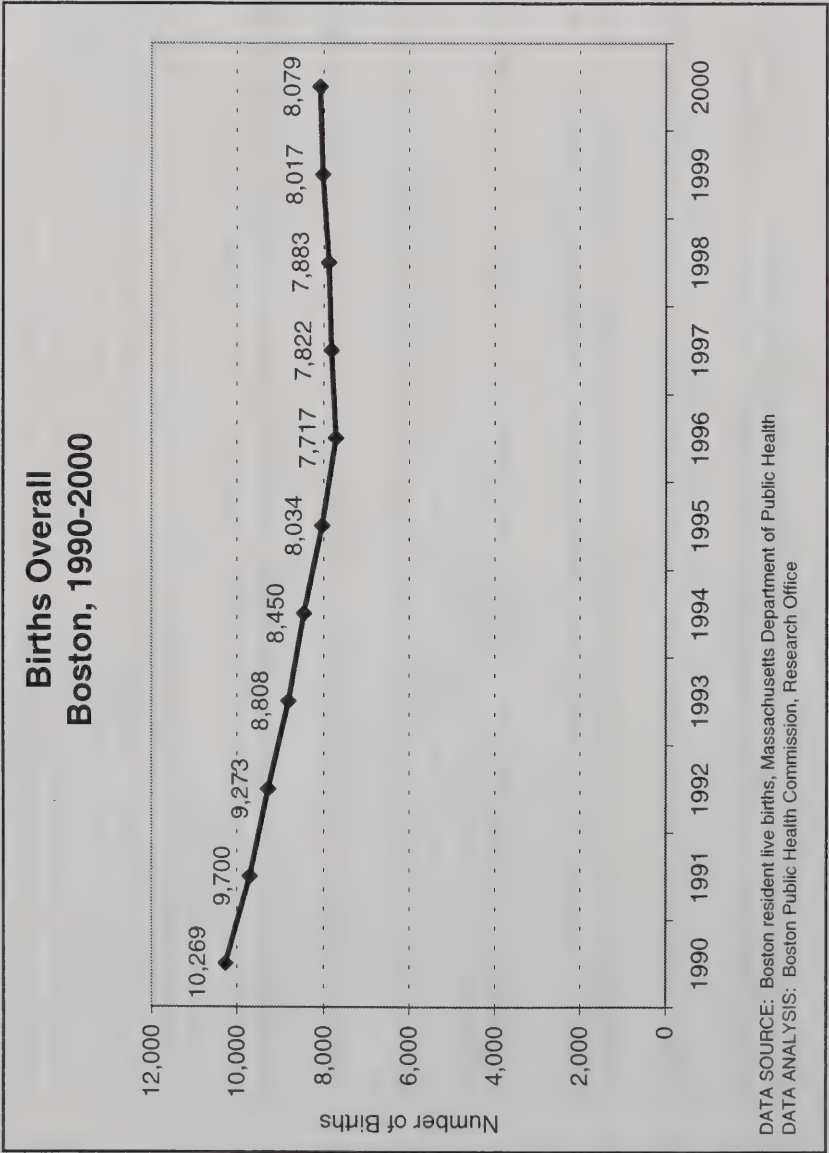
- The total number of Boston resident live births in 2000 was 8,079, up slightly from 8,017 in 1999.
- One-third (31.0%) of Boston births in 2000 were to Black women; one-third (35.2%) were to White women; 21.7% were to Hispanic women; 8.3% were to Asian women, and 3.8% were to women of another or unknown race/ethnicity.
- About one-quarter of Boston births were to women whose primary language was other than English.
- A substantial proportion (45.5%) of births to Boston residents in 2000 were to women born outside the United States, including the US territories of Puerto Rico and the Virgin Islands.
- Approximately ten percent of births to Boston residents in 2000 were to mothers under age 20; 18.1% were to women ages 35 and over.
- A higher percentage of third births and fourth births were to Black or Hispanic women in 2000 than to White or Asian women.
- Only 6.1% of Boston women who gave birth in 2000 reported smoking during pregnancy, a lower percentage than in any previous year. Between 1992 and 2000, the overall decline in smoking during pregnancy by Boston women was 59.3%.
  - In 2000, 7.9% of White women reported smoking during pregnancy, as did 7.3% of Black women, 3.6% of Hispanic women, and 1.7% of Asian women.
  - A higher percentage of women born in the United States reported smoking during pregnancy (9.6%) than women born elsewhere: 4.5% of women born in Puerto Rico and 1.7% of women born in other countries reported smoking during pregnancy.
- In 2000, the percentage of women receiving adequate prenatal care was highest for Dominican (85.3%), Puerto Rican (78.3%), and Jamaican (73.4%) women.
- In 2000, adequate prenatal care was more likely among births to Boston women whose prenatal care was paid for by private insurers (86.6%) than among births to women whose prenatal care was paid for by publicly-fund sources.
- Boston has not experienced a significant increase in multiple births over time. Only 3.6% of Boston births in 2000 were multiple births (twins, triplets, and higher-order births).



- Of women born outside of the United States and its territories, Haitian women had the highest rate of low birthweight (LBW) births (13.4%) in 2000 and El Salvadoran women the second highest rate (8.9%).
- Of the women born in the United States, Black women had the highest rate of LBW in 2000 (14.9%) and Hispanic women the second highest (9.2%). The rate for White women was 7.4%. Asian women had too few LBW births to calculate a rate.
- Low birthweight (LBW) increased among Boston births in 2000, from 8.5% in 1999 to 9.0% in 2000.
- In 2000, the LBW rate for Black women (13.1%) was almost double the rate for White and Asian women (6.7% ) and almost two-thirds higher than the rate for Hispanic women (7.9%). Both of these differences were statistically significant.
- Among Boston's 16 neighborhoods, LBW was most common in Roxbury (11.5% of Roxbury births), and least common in Charlestown (5.0% of Charlestown births), and in the North End (5.6% of North End births).
- Fifty-four Boston infants died in 2000, an infant mortality rate (IMR) of 6.7 deaths per 1,000 live births. The IMR was 9.5% lower than the rate (7.4) in 1999.
- In 2000, slightly over three quarters (79.6%) of Boston infant deaths for which the age at death was known occurred during the first four weeks of life.
- In 2000, Black Boston infants were more than twice as likely to die during the first year of life as White infants, with an IMR of 13.6 deaths per 1,000 live births, compared with an IMR of 6.7 for White infants and 5.1 for Hispanic infants.
- In 1999, the IMR for low birthweight infants was 57.7 times as high as that of normal birthweight infants, and the IMR for extremely low birthweight infants (those weighing less than 1.1 pounds) was 745.6 times as high as that of normal birthweight infants.
- Among Boston infants during 1995-1999, Black infants accounted for almost two thirds of the extremely low birthweight births (61.3%) and deaths (65.2%) among extremely low birthweight infants.
- In 1999, IMRs were lowest for infants of women ages 25-29.
- During 1991-1999 infant mortality rates for twin births were five to ten times greater than the IMRs for singleton births.
- During 1991-1999, IMRs were higher for infants of all races/ethnicities when mothers reported smoking during pregnancy. However, the IMR was higher for Black infants whose mothers smoked than for White or Hispanic infants whose mothers smoked.

## BIRTHS

### Trends



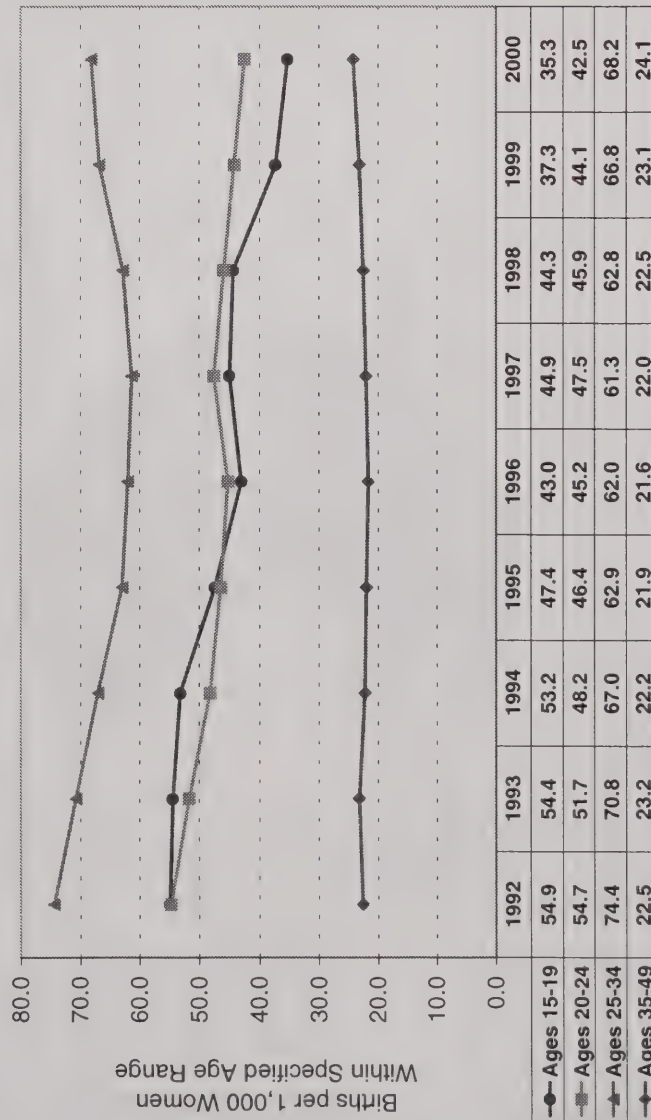
- Boston had 8,079 live births in 2000, an increase of less than one percent over the 1999 total of 8,017 live births.
- This is the fourth year in a row in which the number of live births to Boston residents has increased.
- However, for the entire period of 1990 to 2000, Boston births decreased by 21.3%.



# BIRTHS

## Birth Rates

Age-Specific Birth Rates by Year  
Boston, 1992-2000



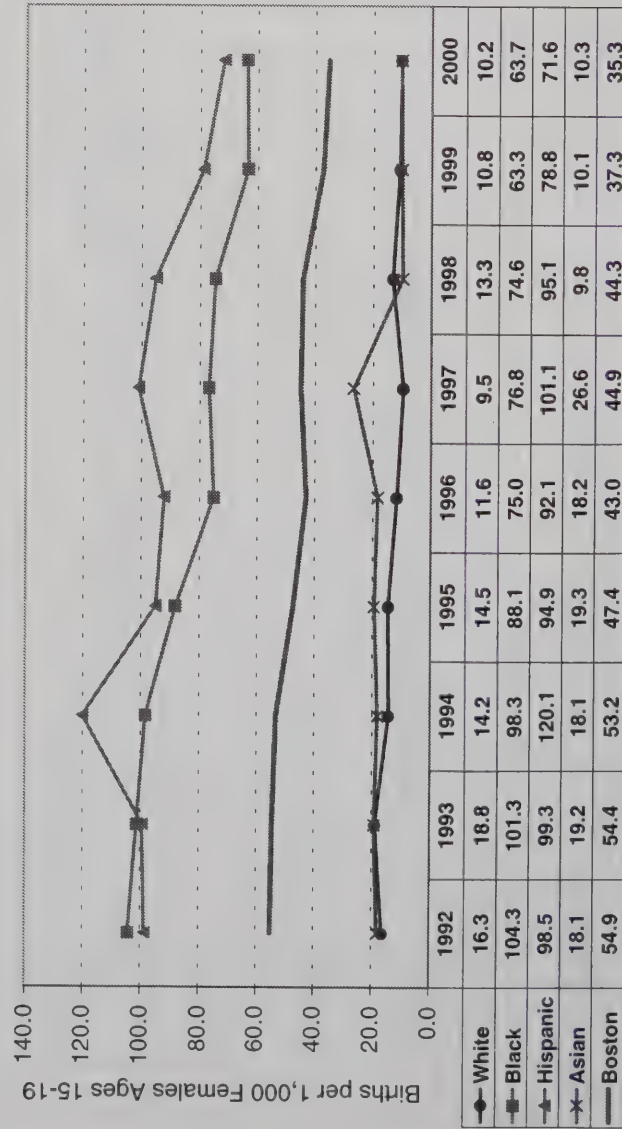
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, the birth rate for Boston adolescents ages 15-19 was 35.3 per 1,000 females in that age range. Women ages 25-34 had the highest birth rate, while the lowest birth rate was among women ages 35-49.
- Between 1992 and 2000, the birth rate for adolescents ages 15-19 fell 35.7%. This decrease was statistically significant.
- From 1992 to 2000, birth rate for women ages 20-24 declined 22.3% (statistically significant). The rate in 1992 was 54.7 per 1,000 women, and in 2000, the rate was 42.5 per 1,000 women. Between 1992 and 2000, the birth rate declined yearly except in 1997.
- Between 1992 and 2000, the birth rate among women ages 25-34 decreased by 8.3% (statistically significant). The birth rate for women in this age group experienced a yearly decline, but between 1998 and 2000, the birth rates increased 8.6% (statistically significant).
- Between 1992 and 2000, age-specific birth rates continued to increase for women ages 35-49. During this time period, birth rates for women in this age group rose 7.1% (not statistically significant).

## BIRTHS

### Birth Rates

**Birth Rates Among Adolescents Ages 15-19  
By Year and Race/Ethnicity of the Mother  
Boston, 1992-2000**



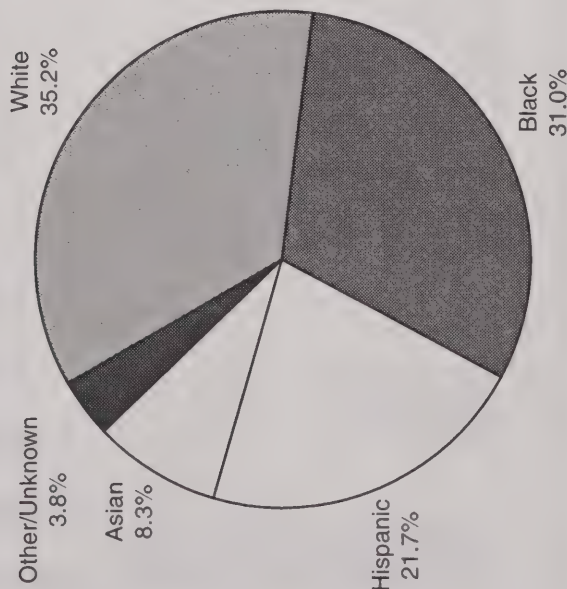
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Births to adolescents ages 15-19 accounted for 9.7% of Boston births in 2000 (785 births), compared with 9.5% in 1999. Boston's overall birth rate for this age group was 35.3 per 1,000 women, higher than the state rate of 25.8.
- Similar to the state and national trends, Boston adolescent birth rates have declined in recent years. Between 1992 and 2000, Boston rates fell 35.7%, a statistically significant decline.
- Adolescent birth rates continue to be substantially higher for Hispanics (71.6 per 1,000 in 2000) and for Blacks (63.7 per 1,000) than for Whites (10.2 per 1,000) and Asians (10.3 per 1,000). The 2000 rate for Hispanics was a decrease of 9.1% from 78.8 in 1999, and for Whites, a decrease of 5.6%, both of which were not statistically significant. Both Blacks and Asians experienced nonsignificant increases from 1999 to 2000.
- Between 1992 and 2000, large declines in adolescent birth rates have occurred in all race/ethnicity groups. Whites experienced a decrease of 37.4%, and Blacks experienced a decrease of 38.9%, both of which were statistically significant. The Hispanic adolescent birth rate fell 27.3% during this period, a decline that was statistically significant, while for Asians, the decrease was 43.1%, a decrease that was not statistically significant.

## MATERNAL CHARACTERISTICS

### *Race/Ethnicity*

**Live Births by Race/Ethnicity of the Mother  
Boston, 2000**



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

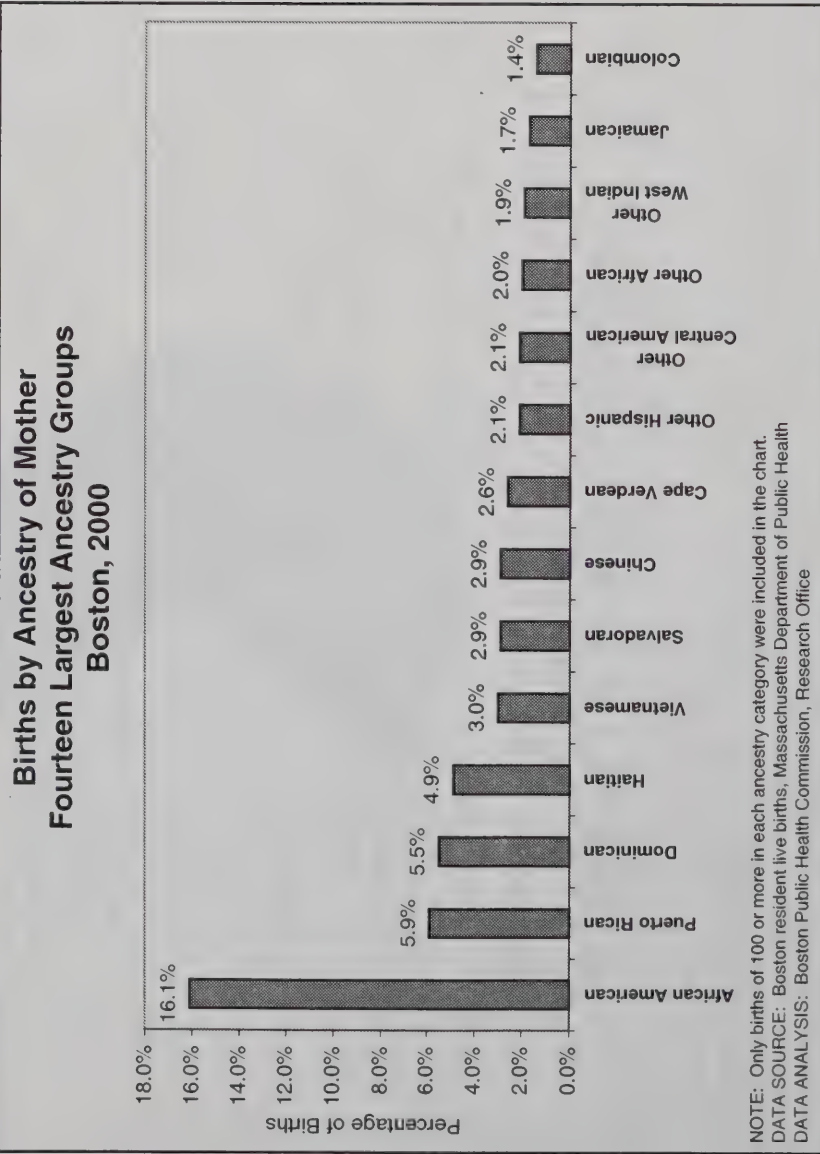
- In 2000, 2,837 Boston births were to White women, 2,498 were to Black women, 1,750 were to Hispanic women, 668 were to Asian women, and 304 were to women of other races/ethnicities.
- The distribution of Boston births by race/ethnicity was virtually unchanged from 1999, except that Asian births rose as a percentage of all births from 7.3% in 1999 to 8.3% in 2000.



# MATERNAL CHARACTERISTICS

## Maternal Ancestry

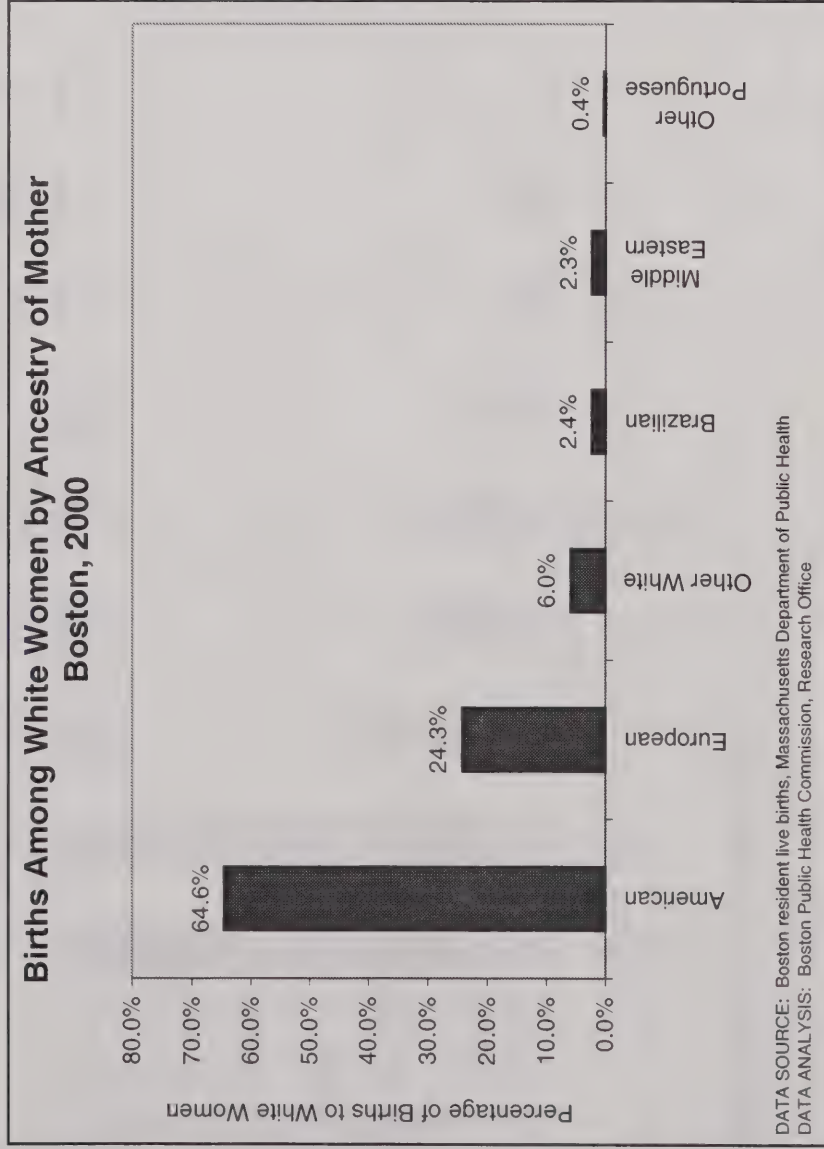
The major race/ethnicity groupings shown in this and the following three charts are based on women's self-reported race and Hispanic or Latino origin. Detailed ancestry information is described in this section.



- The largest percentage of births to Boston women were to women of African-American ancestry.
- Five percent to 6% of births to Boston women were to women of Puerto Rican ancestry, Dominican ancestry, and Haitian ancestry.
- Smaller percentages of births were to women of other ancestries.

# MATERNAL CHARACTERISTICS

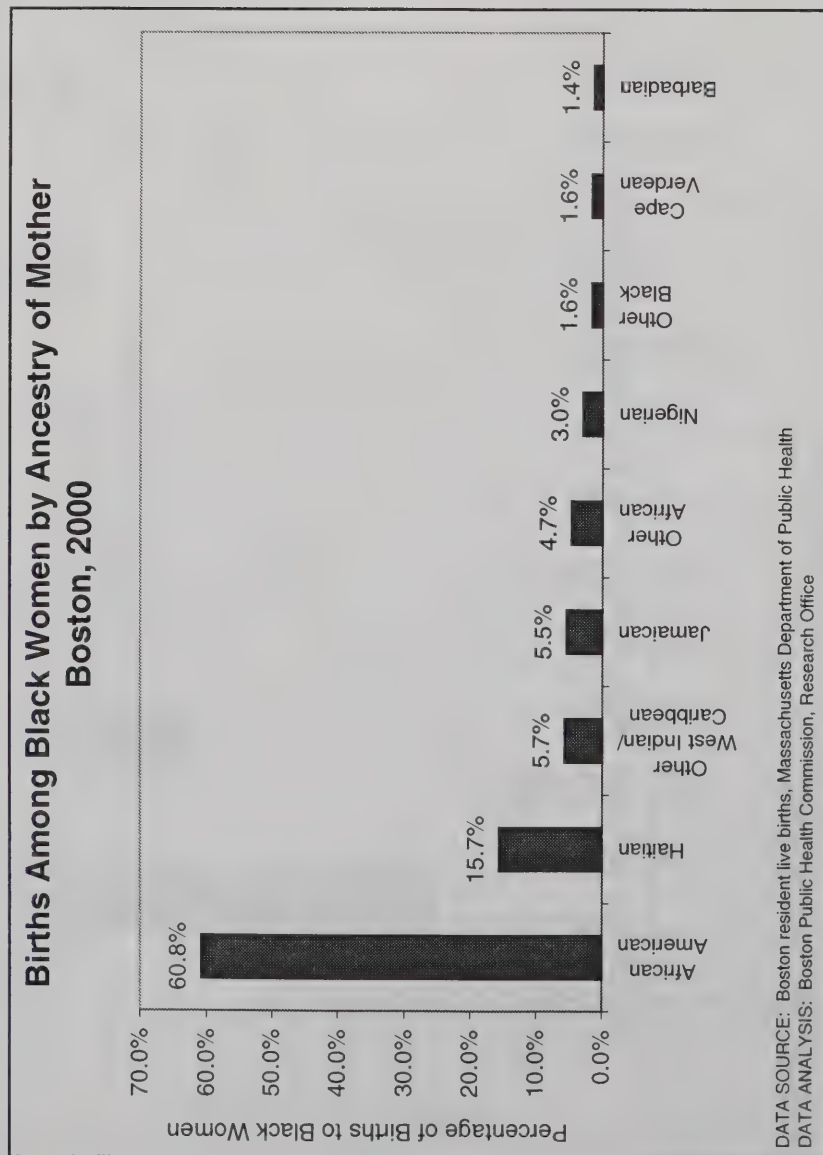
## Maternal Ancestry



- In 2000, close to two-thirds of births to White women were among those who identified their ancestry as “American.”
- Other White Boston residents who gave birth in 2000 identified their ancestry as European, Other White, Brazilian, Middle Eastern, or Portuguese.

## MATERNAL CHARACTERISTICS

### Maternal Ancestry

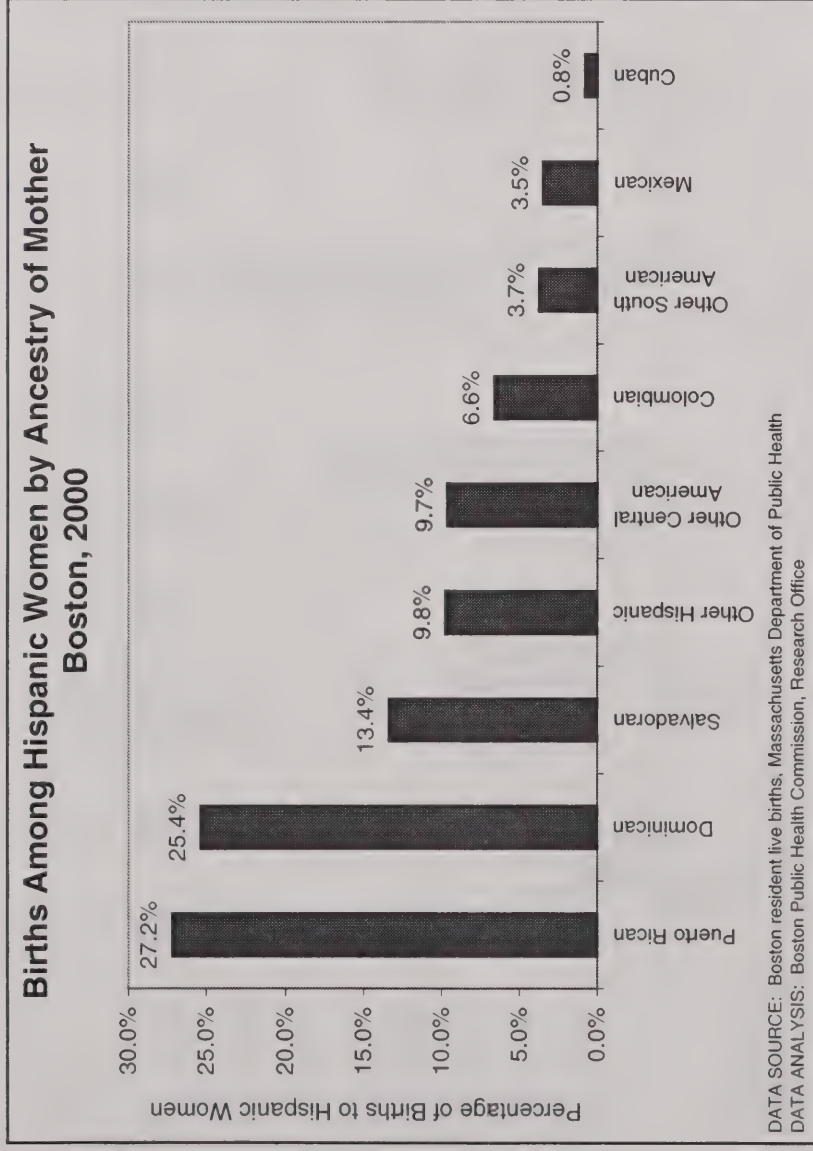


- In 2000, among births to Black women, the majority of births were to women who identified themselves as African American, with Haitian being the next most common ancestry indicated.
- Other ancestries represented smaller proportions of Black births.



## MATERNAL CHARACTERISTICS

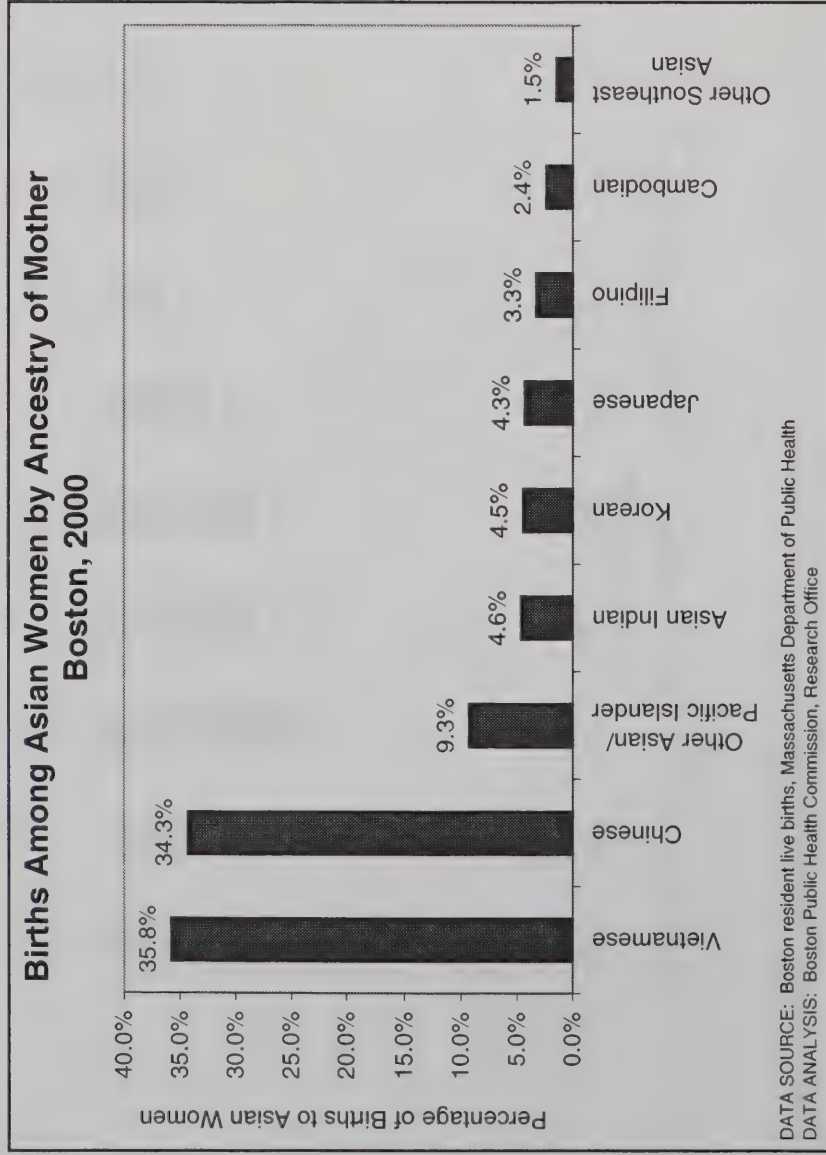
### Maternal Ancestry



- In 2000, among Hispanic women, over a quarter of births were to women of Puerto Rican ancestry, a quarter were to women of Dominican ancestry, 13.4% were to women of Salvadoran ancestry, and about ten percent were to Other Hispanic and other Central American women.
- Smaller percentages of births were to Hispanic women of other ancestries: Colombian, Other South American, Mexican, or Cuban.

# MATERNAL CHARACTERISTICS

## Maternal Ancestry

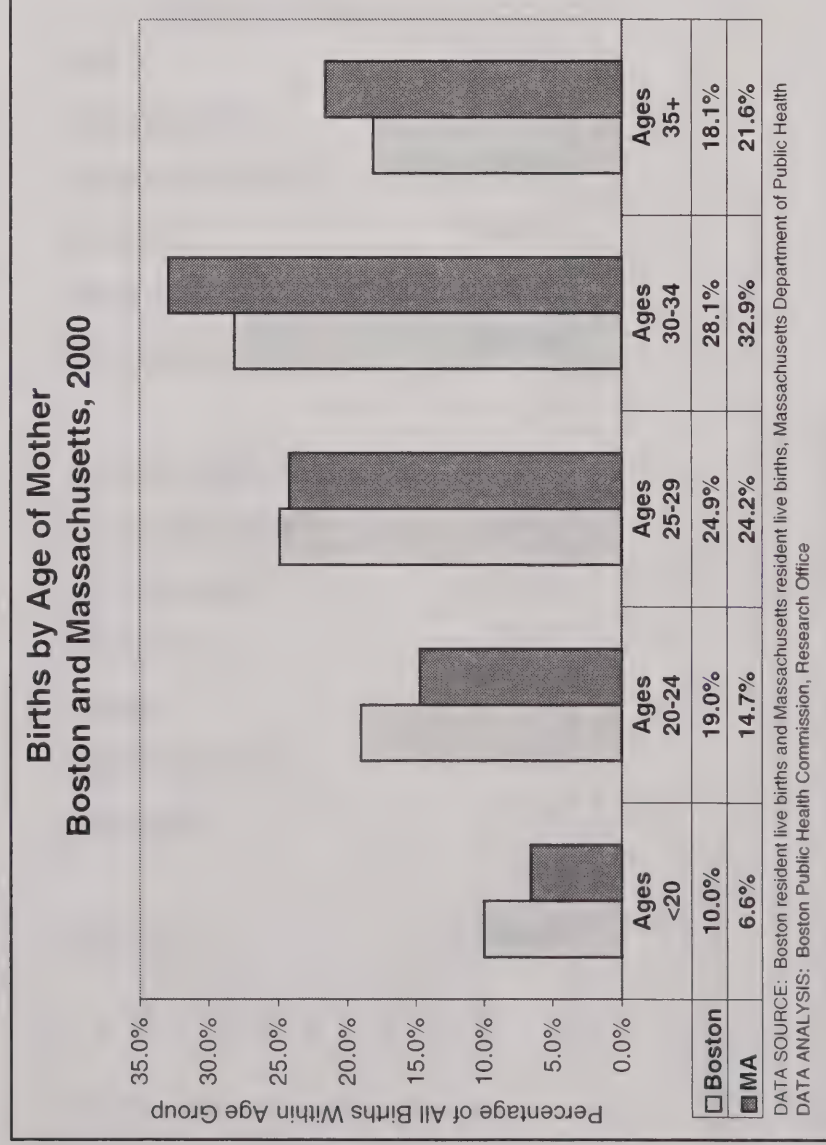


- The largest percentages of Boston births to Asian women were to women of Vietnamese ancestry and those of Chinese ancestry.
- Births to Other Asian/Pacific Islander, Asian Indian, Korean, Japanese, Filipino, Cambodian, and Other Southeast Asian women together totaled the remaining 29.9% of Asian births.

# MATERNAL CHARACTERISTICS

## Maternal Age

- In 2000 in Boston, more than half of all births (4,275) occurred among women ages 25-34 years.
- In Boston, births to women ages 35-49 accounted for 1,461 births, and births to women ages 20-24 accounted for 1,538 births.
- In 2000, Boston's distribution of births by maternal age differed somewhat from that of Massachusetts, with a generally younger age distribution.
- Nineteen percent of Boston births were to women ages 20-24 while fifteen percent of Massachusetts births were to women ages 20-24, a difference between Boston and Massachusetts of 29.3%. Ten percent of Boston births and seven percent of Massachusetts births were to women under age 20, a difference between Boston and Massachusetts of 51.5%.
- In contrast, the percentages of births to Boston women who were ages 30-34 (28.1%) and ages 35 and over (18.1%) were lower than the percentages for these groups in Massachusetts, resulting in differences between Boston and Massachusetts births to women in the two age groups of 14.6% and 16.2%.

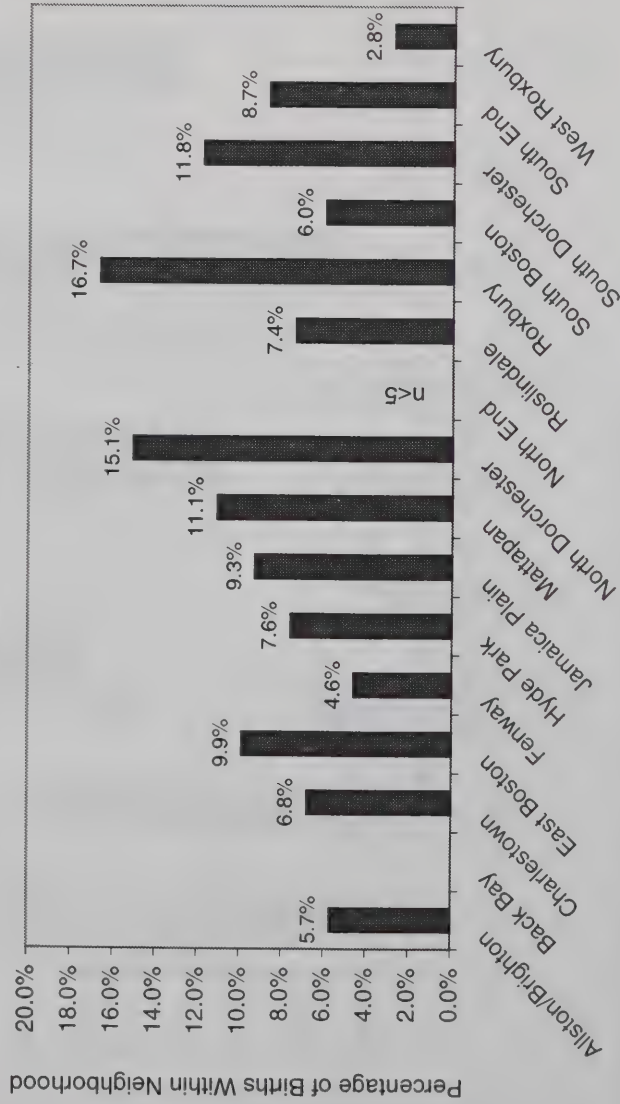




## MATERNAL CHARACTERISTICS

### Adolescents

**Births to Adolescents Ages Less Than 20 by Neighborhood  
Boston, 2000**

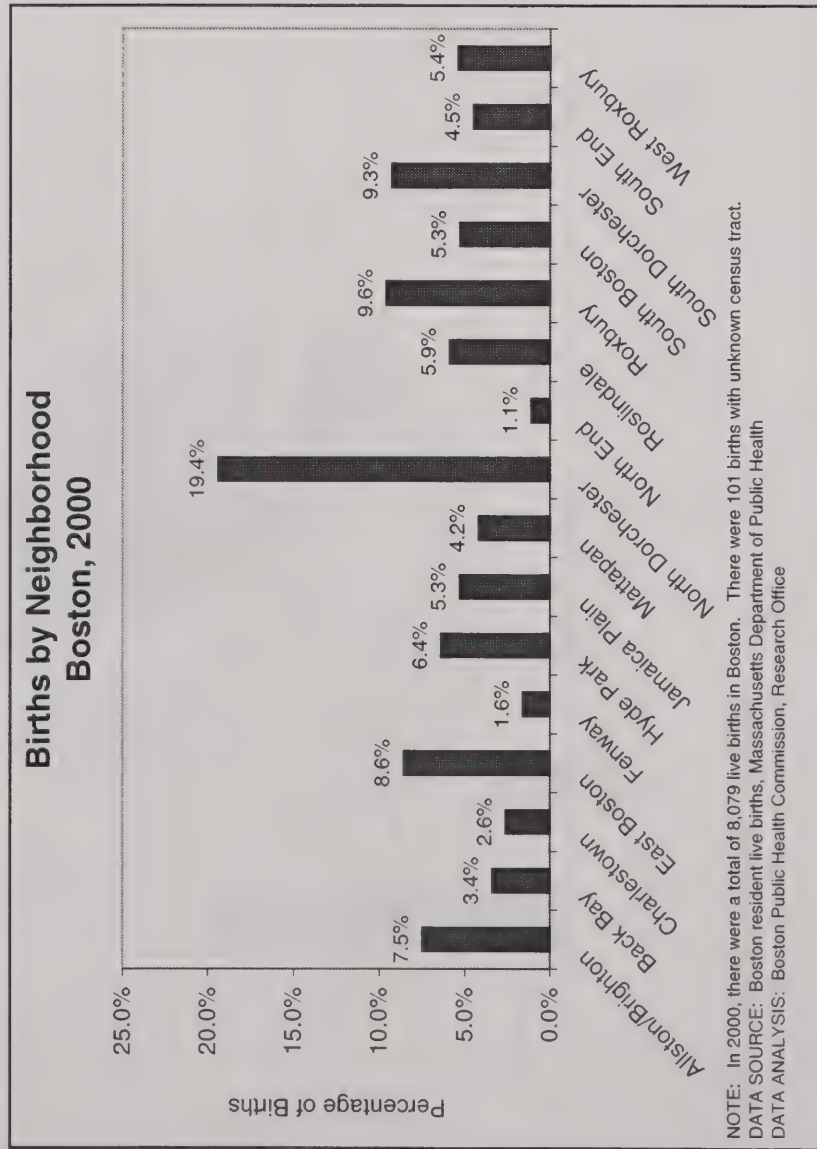


- One in ten Boston births (805 births) were to females under age 20.
- Seventeen percent of Roxbury's births were to females under age 20; 15.1% of Dorchester's births were to adolescents.
- The neighborhoods with the lowest percentages of all births that were to adolescents were West Roxbury and the Fenway.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

# MATERNAL CHARACTERISTICS

## Neighborhood

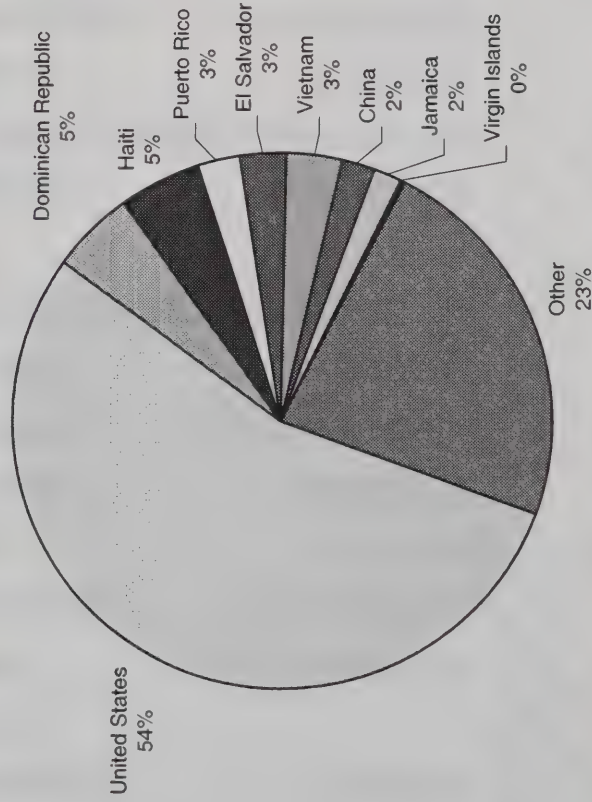


- Boston's largest neighborhood, North Dorchester, had 1,546 births in 2000, almost one in every five Boston births.
- The neighborhoods with the fewest births in 2000 were the North End (89 births) and the Fenway (130 births).

# MATERNAL CHARACTERISTICS

## Maternal Birthplace

**Births by Maternal Birthplace  
Boston, 2000**



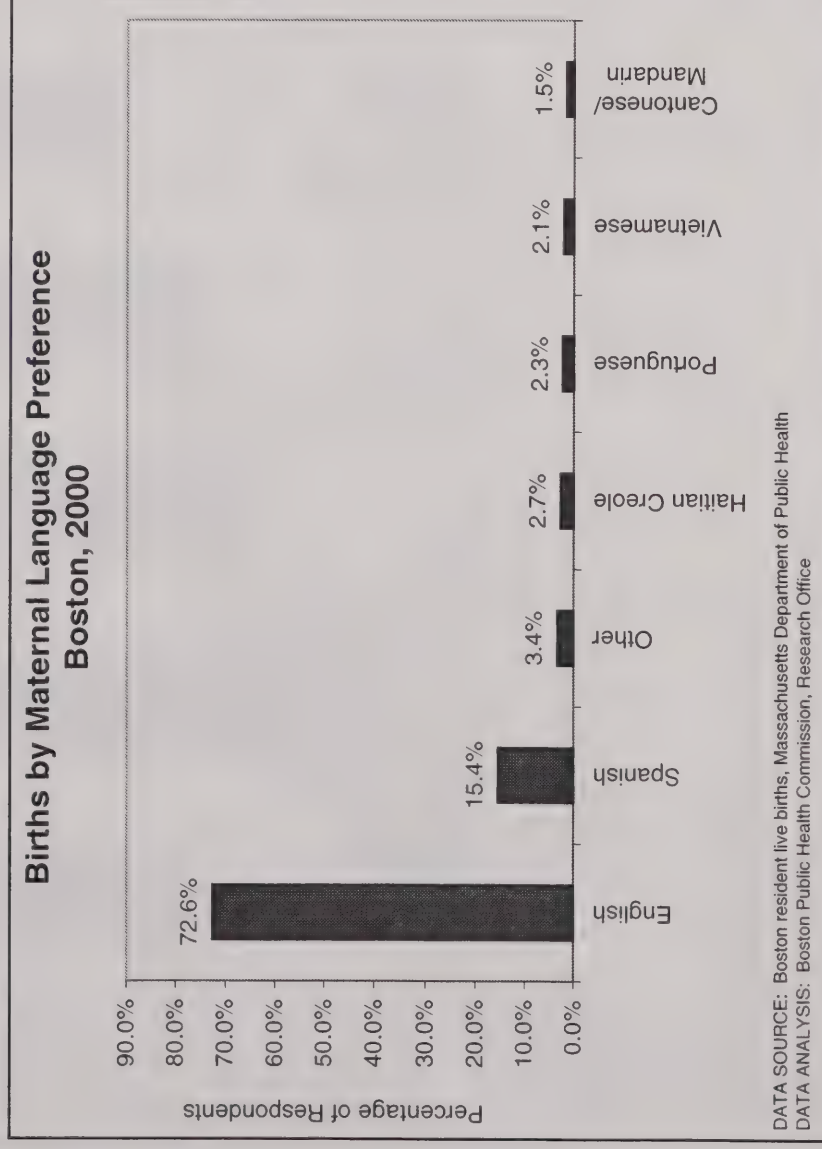
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Of the 8,079 births in 2000, 4,405 were to women born in the United States.
- Women born in the Dominican Republic and Haiti each had 396 births, 226 births were to women born in El Salvador, and 221 births were to women born in Puerto Rico.
- Other maternal countries of origin include Vietnam (260), China (151), and Jamaica (146).
- Other countries, each with less than one percent of all births, collectively represented 23.2% of the Boston births in 2000.



# MATERNAL CHARACTERISTICS

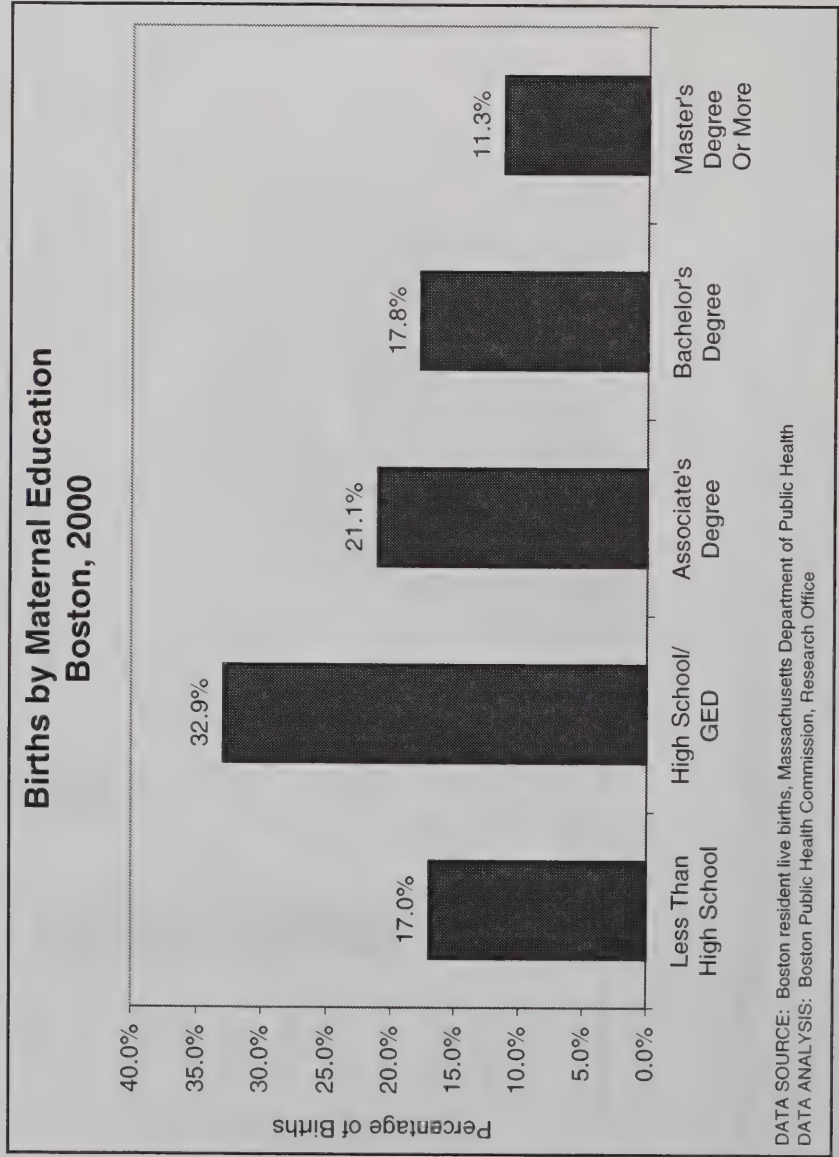
## Language Preference



- In 2000, 5,854 Boston women reported English as their language of choice on the birth certificate.
- Spanish was the preferred language for 1,241 women.
- Haitian Creole, preferred by 218 women, and Portuguese, the language of choice of 181 women, were the next most common languages followed by Vietnamese and Cantonese/Mandarin.
- The languages in the category Other are unspecified. Languages not shown or included in any of the categories (for example, American Sign, Arabic, Camodian, Lao, and Russian) were each indicated by less than one percent of Boston women as their preferred language.

# MATERNAL CHARACTERISTICS

## Educational Attainment

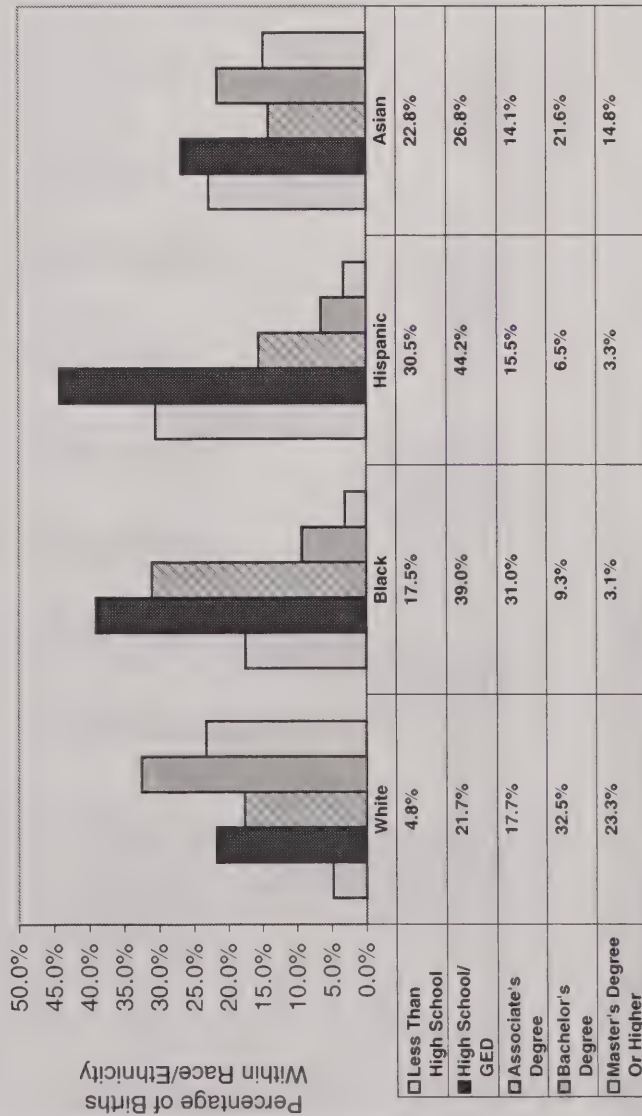


- Almost one in six Boston births in 2000 (17.0%) were to women who had less than a high school education.
- One third (32.9%) were to women who had a high school diploma or equivalent. Over half (50.2%) were to women with at least some college education.
- Since 1992, the percentage of all births that were to women with less than a high school education has declined 36.8%; the percentage to women with a bachelor's degree has increased 54.8%; and the percentage to women with a master's degree or more has increased 34.5%. Percentages of births to women at other levels of educational attainment have remained largely unchanged.

# MATERNAL CHARACTERISTICS

## Educational Attainment

**Births by Maternal Education by Race/Ethnicity  
Boston, 2000**



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

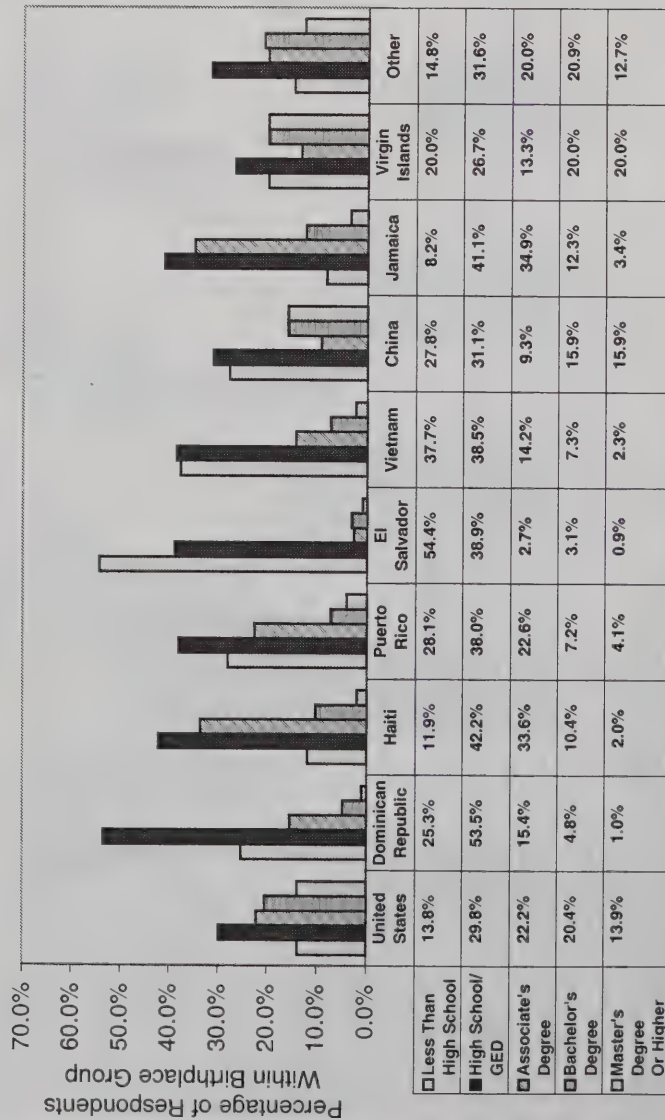
- The level of education of Boston women who give birth differs greatly by race and ethnicity, with Hispanics and Blacks generally having lower levels of education than Whites and Asians.
- In 2000, over fifty percent of White births and over thirty percent of Asian births were to women with a bachelor's degree or higher. Less than five percent of White births were to women with less than a high school education.
- About twelve percent of Black births and ten percent of Hispanic births were to women with a bachelor's degree or higher. In addition, almost one third of Hispanic births, and one fifth of Asian and Black births were to women with less than a high school education.



# MATERNAL CHARACTERISTICS

## Educational Attainment

**Births by Maternal Education by Birthplace**  
Boston, 2000

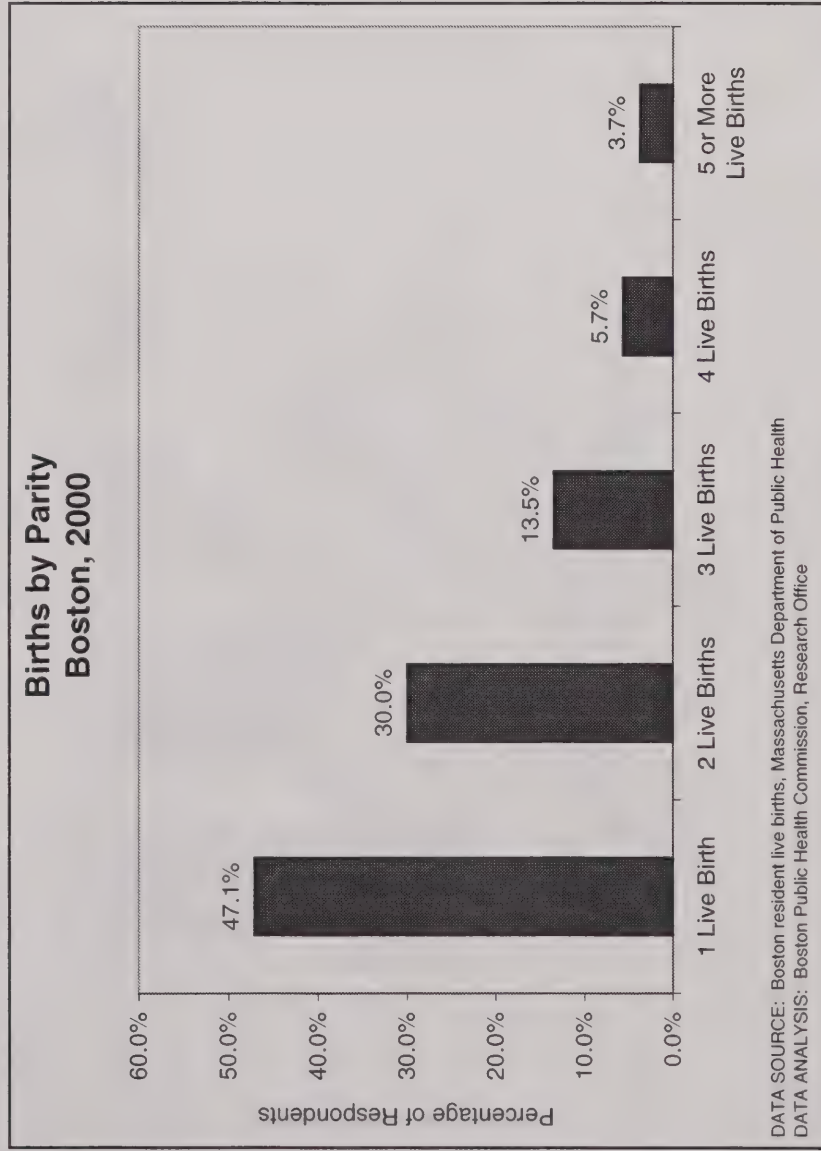


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, the highest percentage of Boston births to women without a high school diploma or equivalent (54.5%) was found among women from El Salvador. The second and third highest percentages (37.7% and 28.1%) were found among women from Vietnam and from Puerto Rico.
- Among births to women from Dominican Republic, slightly more than half (53.5%) were to women with a high school diploma or equivalent. High percentages of births to women born in Haiti (42.2%) or Jamaica (41.1%) were also to those who had a high school diploma or equivalent.
- The percentage of births to women with at least some college was highest for women born in the United States, US Virgin Islands, and Jamaica.

# MATERNAL CHARACTERISTICS

## Parity

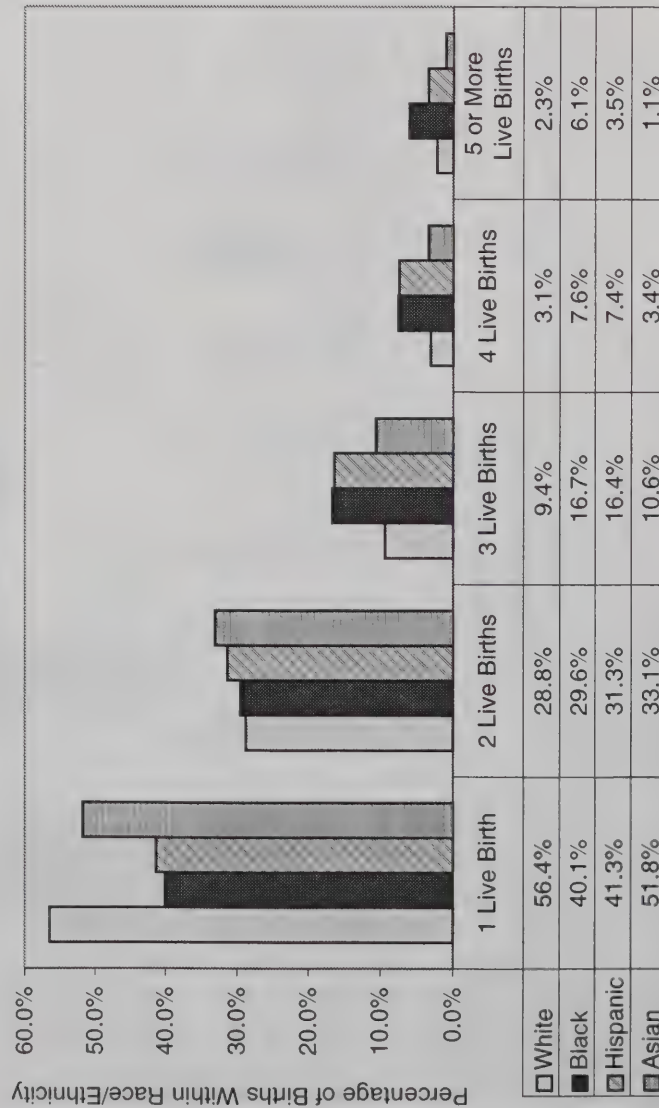


- First births accounted for 47.1% of births to Boston residents in 2000.
- Thirty percent of births were to women having their second child; 13.5% were third births; 5.7% were fourth births; and the rest (3.7%) were to women with five or more children including the current birth.
- Over time, there have been small increases in women having their first or second births. Since 1990, first births as a percentage of all births increased 6.6%, and second births increased 6.8%. There have been decreases among higher-order births, the largest among fifth or higher-order births (28.8% decline).

# MATERNAL CHARACTERISTICS

## Parity

**Births by Parity by Race/Ethnicity  
Boston, 2000**



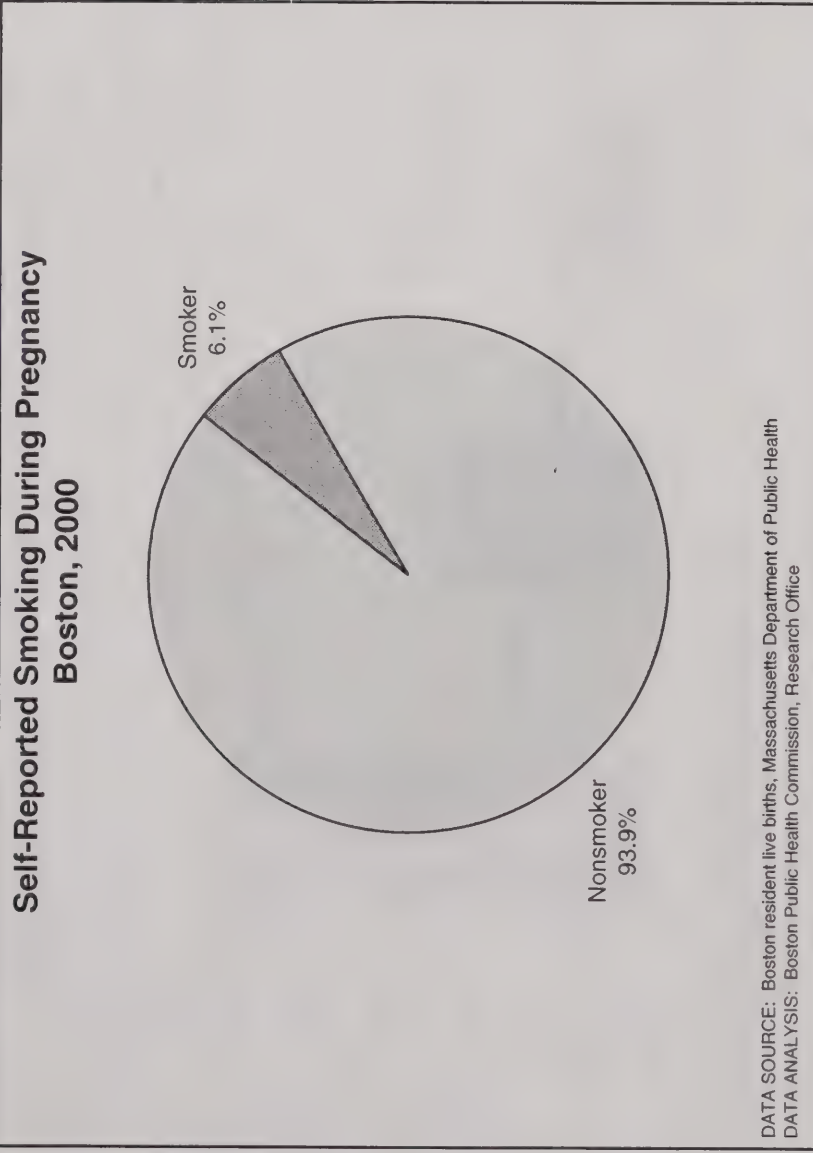
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Among all races/ethnicities, a higher percentage of first births all were to White women (56.4%) and to Asian women (51.8%) than to Black women (40.1%) or Hispanic women (41.3%).
- Approximately thirty percent of births among White, Black, and Hispanic women were to those having their second child; a slightly higher percentage of births (33.1%) were to Asian women having their second child.
- Black women and Hispanic women had higher percentages of third and forth births than White and Asian women.



## MATERNAL CHARACTERISTICS

### *Smoking During Pregnancy*

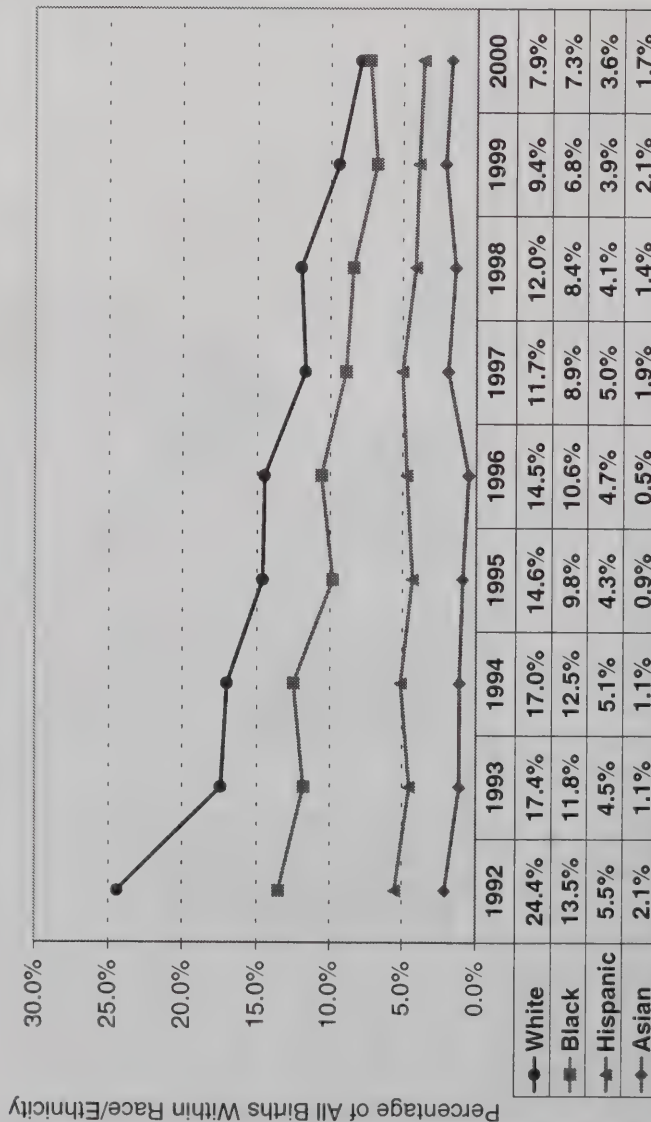


- Women who smoke during pregnancy are subject to a greater risk of adverse birth outcomes than women who do not. In 2000, only 6.1% of Boston women reported smoking during pregnancy, a decline of 59.3% since 1992. This was a statistically significant change over time.

# MATERNAL CHARACTERISTICS

## Smoking During Pregnancy

Smoking During Pregnancy by Race/Ethnicity  
Boston, 1992-2000

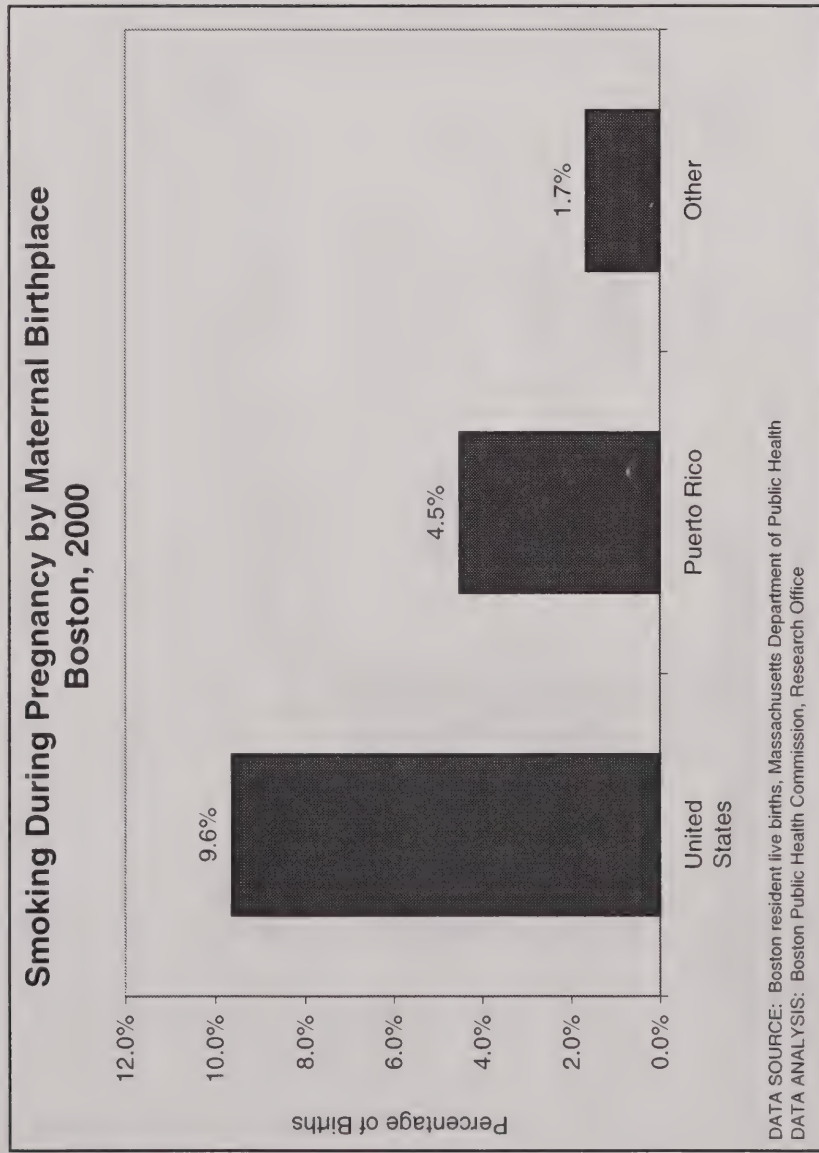


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, smoking during pregnancy was more frequently reported by White women than by women of other racial/ethnic groups. The White rate was 8.2% higher than the rate for Black women (not a statistically significant difference), more than double the rate for Hispanic women (a statistically significant difference), and more than four times the rate for Asian women (also a statistically significant difference).
- Between 1992 and 2000, smoking during pregnancy by White women fell 67.6%, a decline that was statistically significant. Smoking during pregnancy by Black women declined 45.9%, also a statistically significant decrease.
- There were slight decreases between 1999 and 2000 in the percentage of Hispanic women who reported smoking while pregnant, declines that were not statistically significant, and the percentage of Asian women who reported smoking while pregnant fluctuated, due to small numbers.

## MATERNAL CHARACTERISTICS

### Smoking During Pregnancy



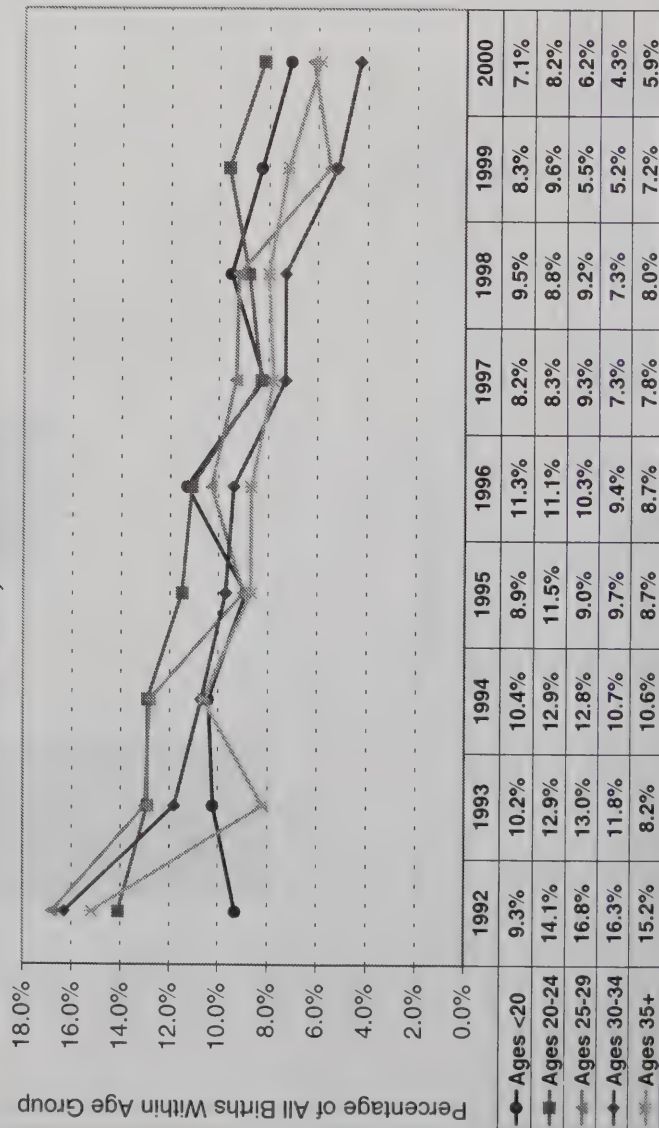
- Almost one in ten US-born women smoked while pregnant, compared with one in 22 women born in Puerto Rico, and even lower percentages among women born in other countries.



# MATERNAL CHARACTERISTICS

## Smoking During Pregnancy

Smoking During Pregnancy by Maternal Age by Year  
Boston, 1992-2000

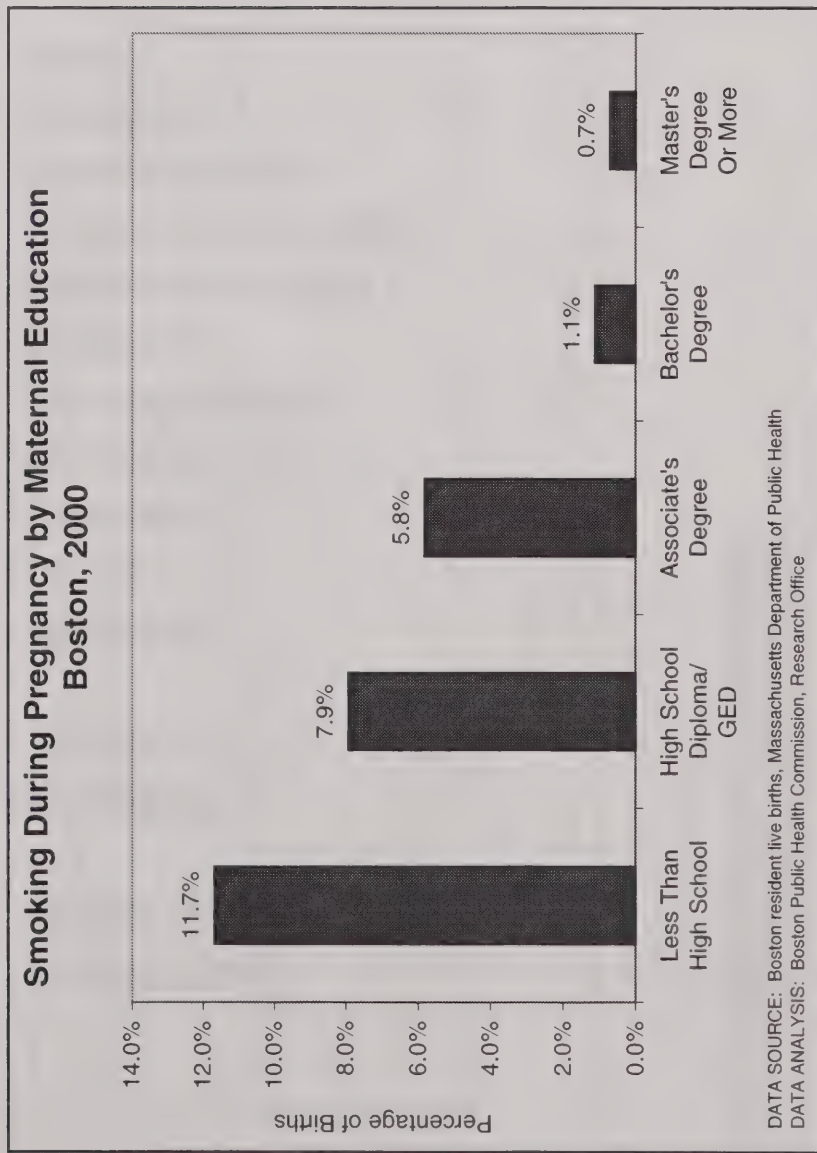


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- During 2000, Boston residents most likely to smoke during pregnancy were those ages 20-24.
- The lowest level of smoking during pregnancy was found among those ages 30-34.
- Between 1992 and 2000, the percentage of births that were to women who reported smoking during pregnancy declined for all age groups. These declines were statistically significant for all age groups except for those under age 20.

## MATERNAL CHARACTERISTICS

### *Smoking During Pregnancy*

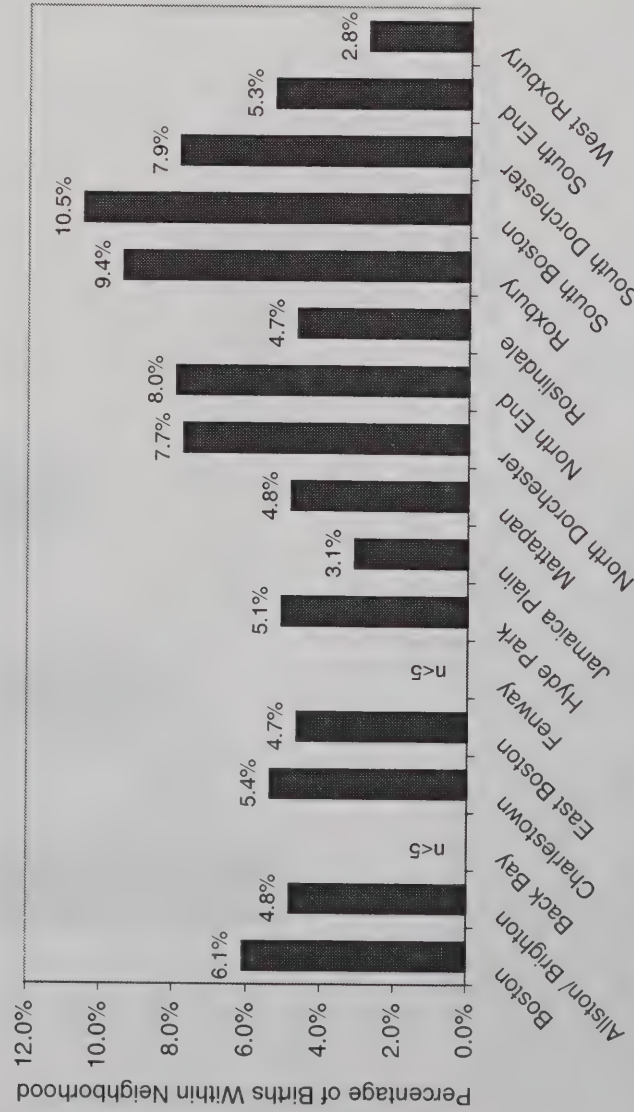


- In 2000, in Boston, smoking during pregnancy has a linear relationship to education, with smoking most common among women with less than a high school education, less frequent among those with a high school diploma or GED, and so on.

## MATERNAL CHARACTERISTICS

### Smoking During Pregnancy

Smoking During Pregnancy by Neighborhood  
Boston, 2000



- Overall, 6.1% of Boston births in 2000 were to women who reported smoking during pregnancy. South Boston, Roxbury, the North End, and South Dorchester had the highest rates of reported smoking during pregnancy in 2000, and Jamaica Plain, West Roxbury, Roslindale, and East Boston had the lowest rates. The Back Bay and the Fenway each had fewer than five births to women who reported smoking.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office



# MATERNAL CHARACTERISTICS

## Prenatal Care Payment Source

Source of Payment for Prenatal Care  
Boston, 2000

Source of Payment	Percentage of Births
<b>Private Insurance</b>	<b>50.7%</b>
HMO	40.7%
Commercial Insurance	6.0%
Blue Cross	3.8%
<b>Public Insurance</b>	<b>48.2%</b>
Medicaid/CommonHealth	40.0%
Healthy Start	4.4%
Other Government	3.6%
Free Care	0.3%
Medicare	0.1%
<b>Other Insurance</b>	<b>1.1%</b>
Other	0.6%
Self Payer	0.5%
Worker's Compensation	n<5

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, payment for prenatal care for Boston births was almost evenly split between private insurers, for example, Blue Cross, commercial insurance, and health maintenance organizations (HMO), and publicly funded sources (for example, Medicaid/CommonHealth, the state Healthy Start program, other government programs, and the Uncompensated Care Pool).
- Other sources, neither public nor private, included worker's compensation, self-payer, and "other."
- Of prenatal care paid for by private insurance payers, most was paid for by HMOs.
- Of prenatal care paid for by public insurance payers, most was paid for by Medicaid/CommonHealth.
- For most years since 1992, private insurance has covered prenatal care for more births than were covered by public insurance.

MATERNAL CHARACTERISTICS

*Prenatal Care Payment Source*

**Source of Payment for Prenatal Care  
By Race/Ethnicity  
Boston, 2000**

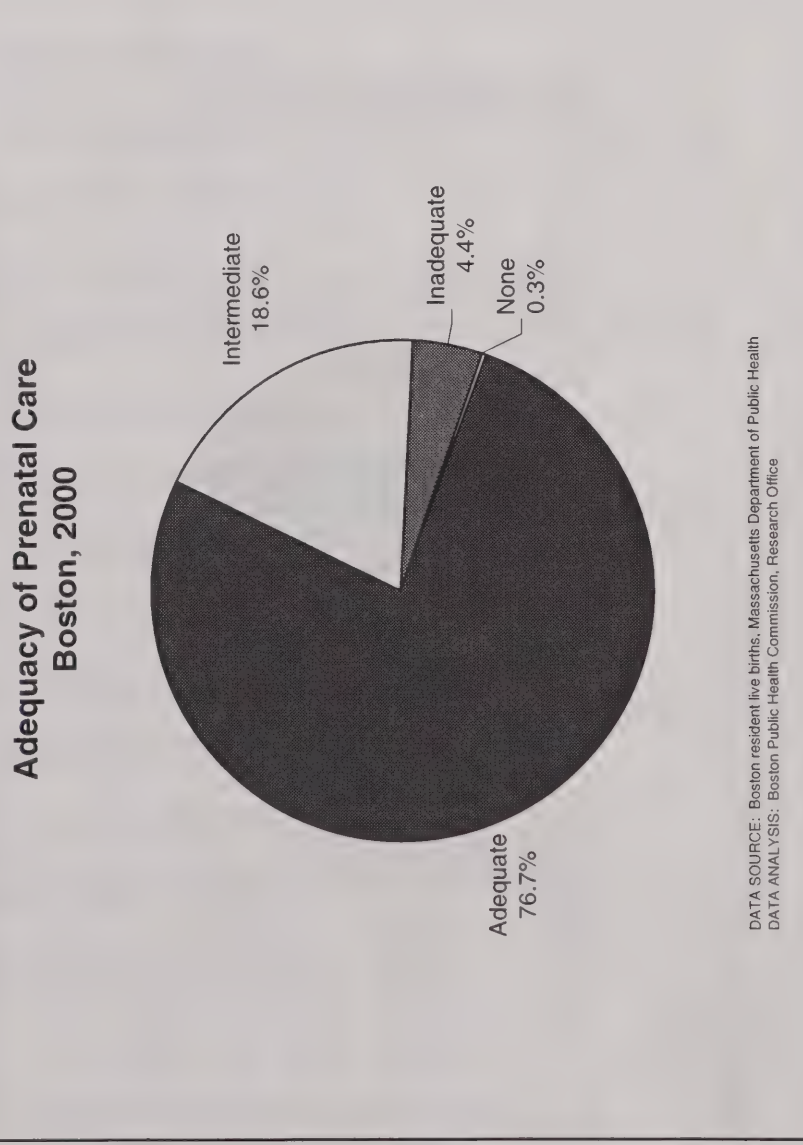
Payment Source	Race/Ethnicity			
	White	Black	Hispanic	Asian Other
<b>Private</b>				
HMO	63.2%	31.5%	20.5%	41.5%
Commercial Insurance	8.0%	3.7%	3.8%	11.4%
Blue Cross	6.7%	2.1%	1.6%	4.5%
TOTAL	77.9%	37.3%	25.9%	57.3%
<b>Public</b>				
Medicaid/CommonHealth	17.4%	53.4%	55.4%	38.6%
Healthy Start	2.2%	1.6%	13.3%	1.2%
Other Government	1.2%	6.6%	3.4%	1.5%
Free Care	n<5	0.2%	0.3%	n<5
Medicare	n<5	n<5	n<5	0.0%
TOTAL	20.9%	61.9%	72.6%	41.8%
<b>Other</b>				
Other	0.4%	0.6%	0.8%	n<5
Self Payer	0.8%	n<5	0.6%	0.8%
Worker's Compensation	n<5	0.0%	n<5	0.0%
TOTAL	1.2%	0.8%	1.5%	0.9%

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- White women had prenatal care paid primarily by private insurance payers, 77.9% of which was provided by HMOs. Most Asian women also received prenatal care from private sources, 57.3% of which was provided by HMOs.
- Black, Hispanic, and women of other race/ethnicity had prenatal care paid primarily by public payers, most of which was provided by Medicaid/CommonHealth.

## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care*



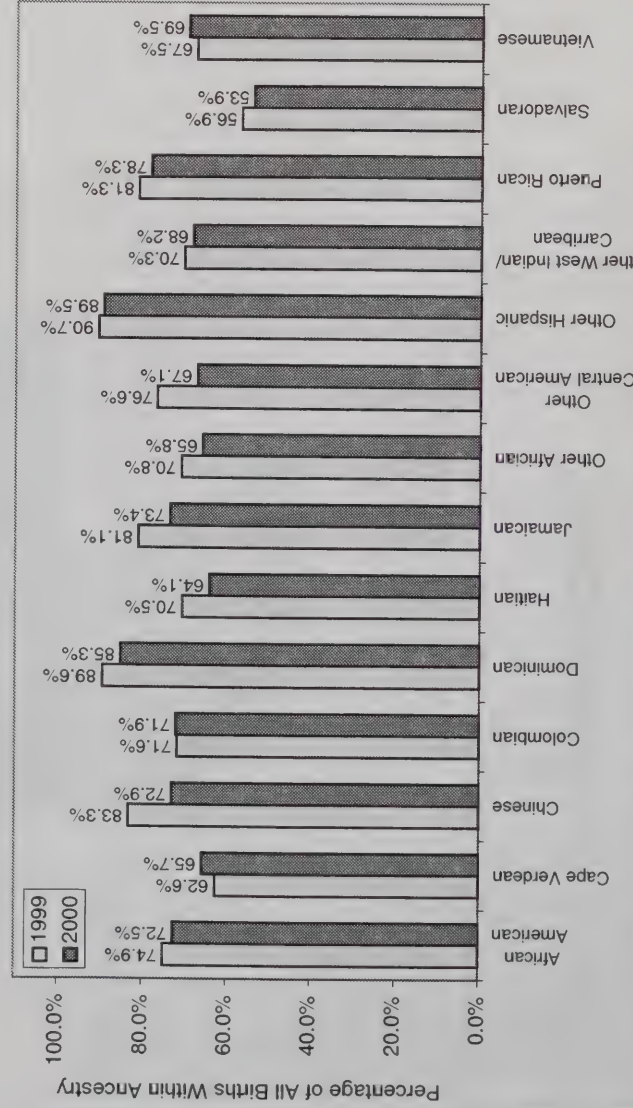
- In 2000, 76.7% of Boston births were to women who received adequate prenatal care. This was a statistically significant decrease of 3.2% from 1999, in which 79.2% of women received adequate prenatal care.
- Between 1999 and 2000, the percentage of women who received intermediate prenatal care increased by 10.7%. This was a statistically significant change. In the same period, the percentage of women who received inadequate prenatal and no prenatal care increased by 14.6%; however, this increase was not statistically significant.



# MATERNAL CHARACTERISTICS

## Adequacy Of Prenatal Care

**Adequate Prenatal Care by Maternal Ancestry  
Boston, 1999 and 2000**

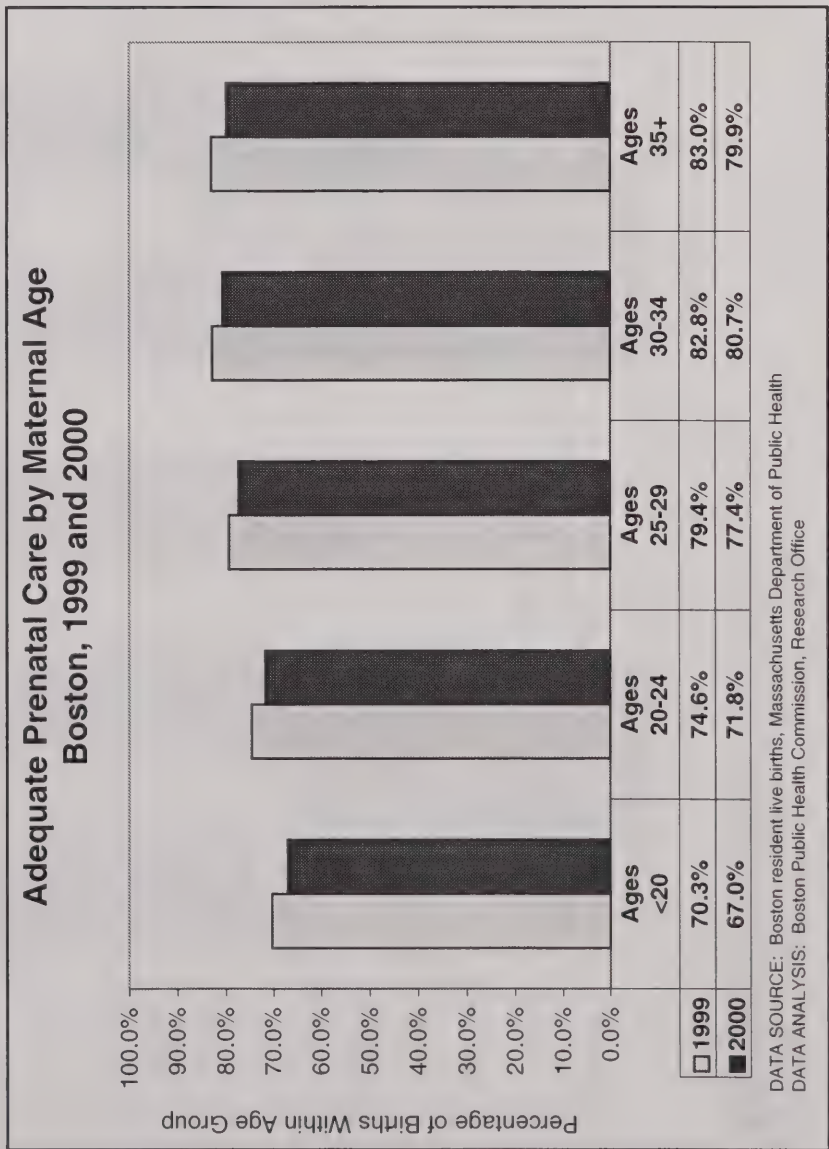


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, the percentage of women receiving adequate prenatal care was highest for Other Hispanic, Puerto Rican, and Jamaican women. During the same period, Salvadoran and Haitian women had the lowest percentage receiving adequate prenatal care.
- Between 1999 and 2000, adequate prenatal care increased 5.0% for women whose ancestry was Cape Verdean and 3.0% for women whose ancestry was Vietnamese; however, these increases were not statistically significant.
- The largest decrease was seen in women whose ancestry was Chinese (12.5%) or Other Central American (12.4%). The change was statistically significant for Chinese women. Jamaicans and Haitians had the next largest decreases (9.5% for Jamaicans and 9.1% for Haitians). These decreases were not statistically significant changes. Smaller declines in adequate prenatal care were seen in African Americans (3.2%), Other West Indian/Caribbean (3.0%), and other Hispanic women (1.3%). These decreases were not statistically significant.

# MATERNAL CHARACTERISTICS

## Adequacy Of Prenatal Care



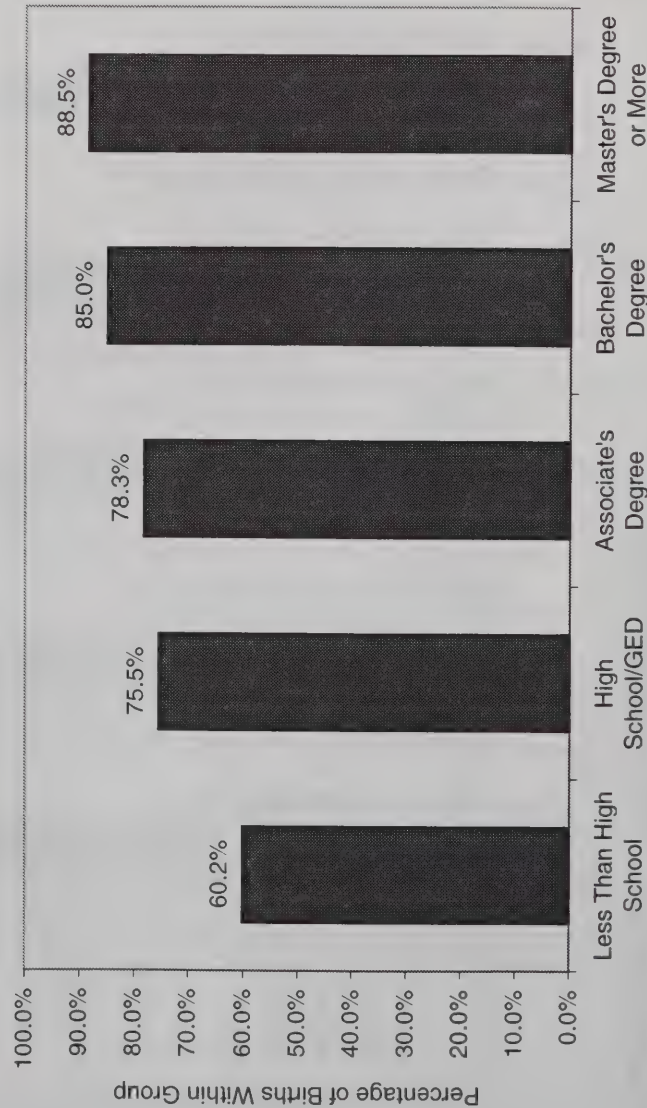
- Adequacy of prenatal care varies by age. Women under age 20 had the lowest percentage receiving adequate prenatal care, while women ages 30-34 and 35 and over had the highest.
- In 2000, 32.1% of Boston births to women under age 20 and 22.0% of births to women ages 20 and over were to women who had intermediate or inadequate prenatal care (data not shown). This difference by age was statistically significant.
- Between 1999 and 2000, decreases in adequate prenatal care occurred across all age groups. The largest decrease was experienced by women under age 20, from 70.3% in 1999 to 67.0% in 2000, a drop of 4.7%. However, this decrease was not statistically significant.
- The smallest declines in adequate prenatal care occurred for women ages 25-29 and ages 30-34, each at 2.5%.



## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care*

**Adequate Prenatal Care by Maternal Education  
Boston, 2000**



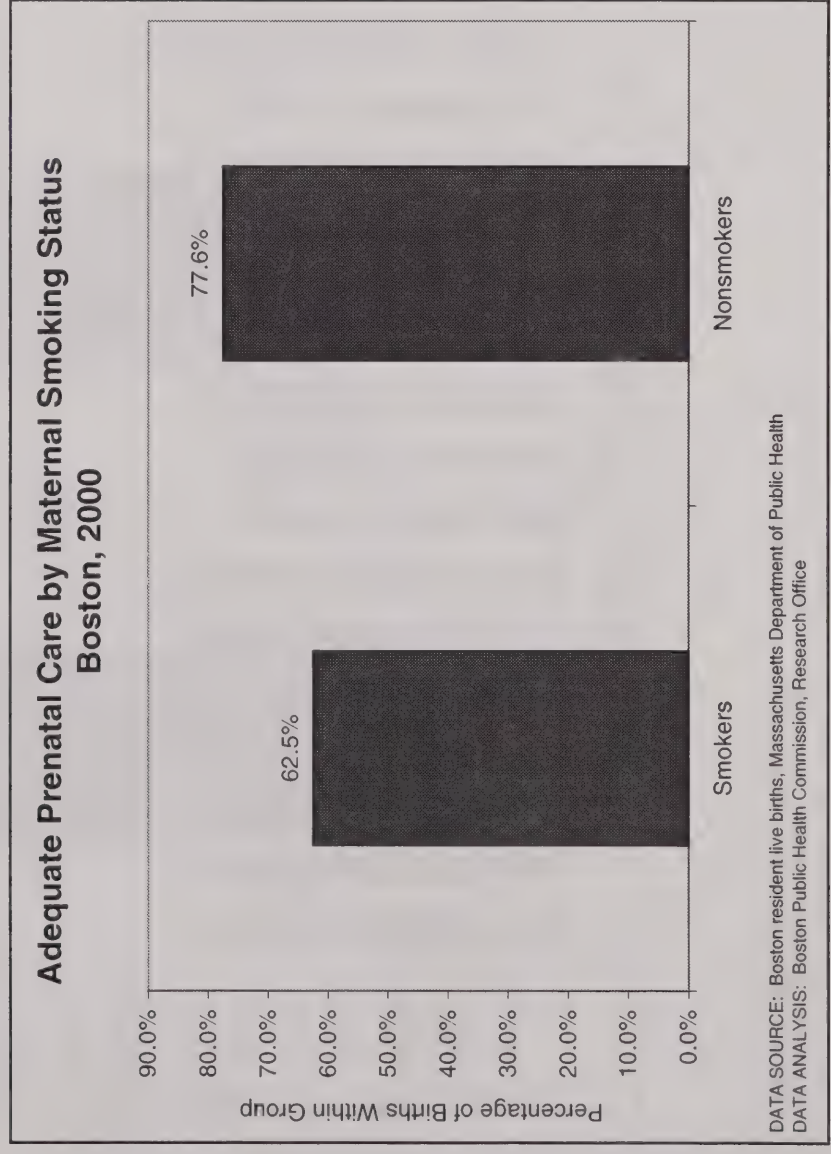
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Adequate prenatal care increases with the level of education achieved by the mother. Boston women with less than a high school education had the lowest percentage receiving adequate prenatal care.
- The 32.0% difference between women with less than a high school education and those with a master's degree or higher was statistically significant.



## MATERNAL CHARACTERISTICS

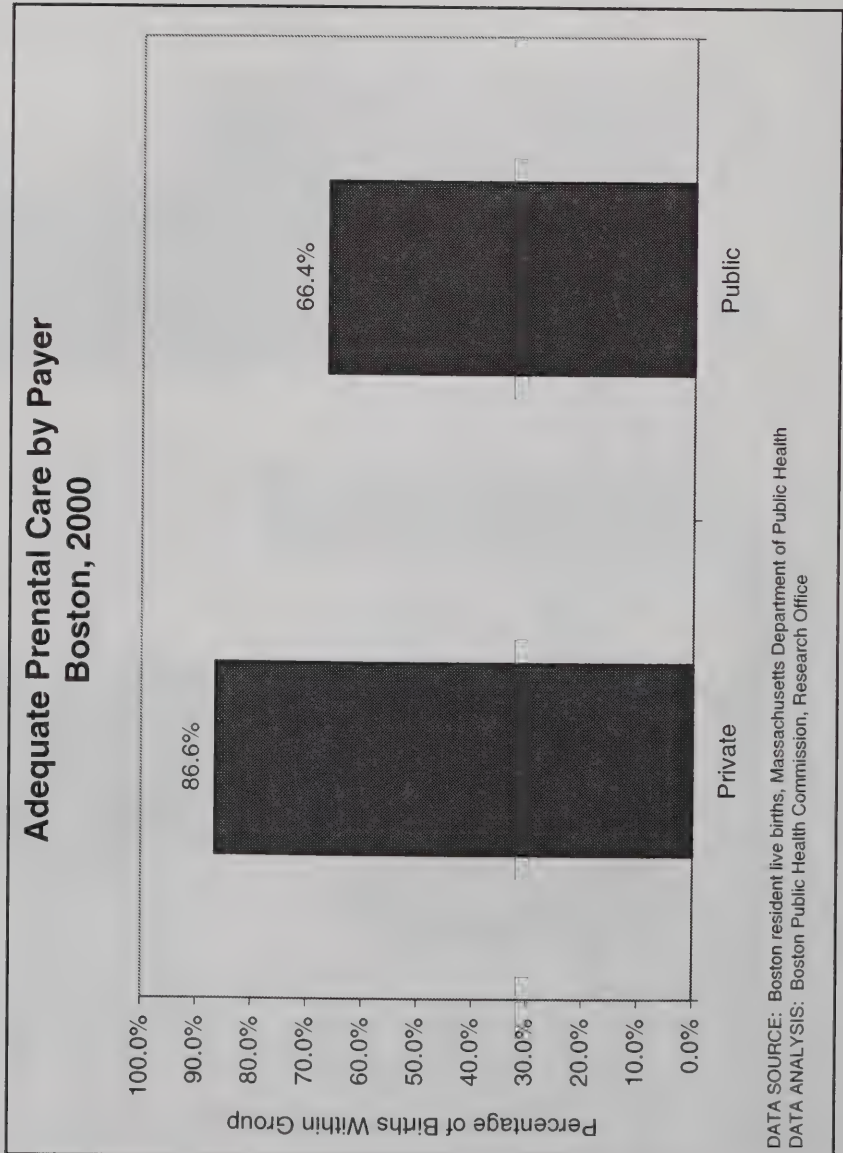
### *Adequacy of Prenatal Care*



- In 2000, adequate prenatal care was significantly less common among births to Boston women who reported smoking during pregnancy.
- The percentage of women who received intermediate or inadequate prenatal care was significantly higher among women who smoked during pregnancy (35.5%) than among women who did not smoke during pregnancy (22.2%) (data not shown).

# MATERNAL CHARACTERISTICS

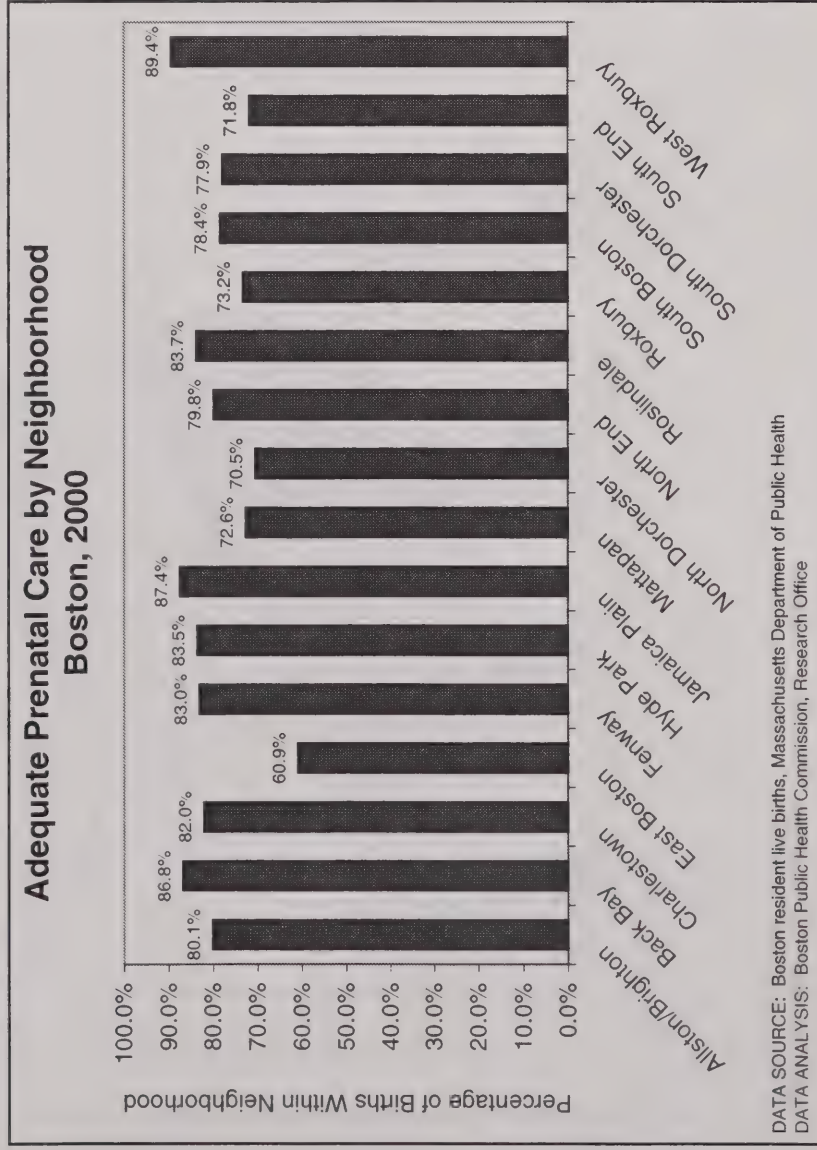
## Adequacy of Prenatal Care



- In 2000, adequate care was more common among births to Boston women whose prenatal care was paid for by private insurers than among women whose prenatal care was paid for by publicly-funded sources such as Medicaid, Medicare, Healthy Start, other public programs, or the Uncompensated Care Pool. This difference was statistically significant.

## MATERNAL CHARACTERISTICS

### Adequacy of Prenatal Care



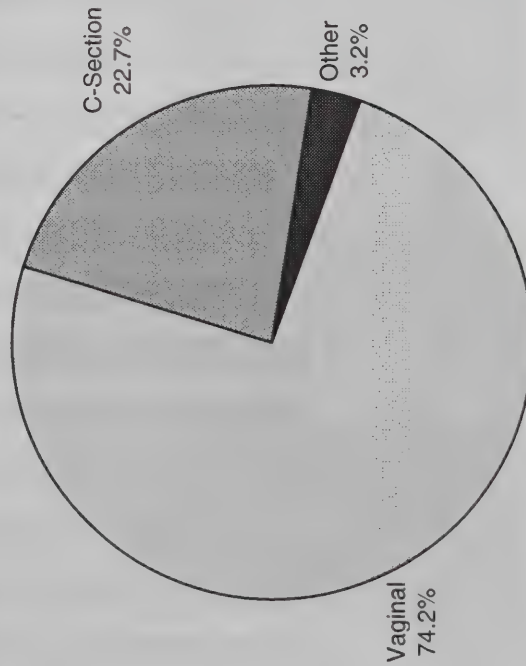
- Adequacy of prenatal care varies by Boston neighborhood. In 2000, the percentage of births to women who received adequate prenatal care ranged from a high of 89.4% in West Roxbury to a low of 60.9% in East Boston.



## MATERNAL CHARACTERISTICS

### *Delivery Method*

**Births by Method of Delivery  
Boston, 2000**



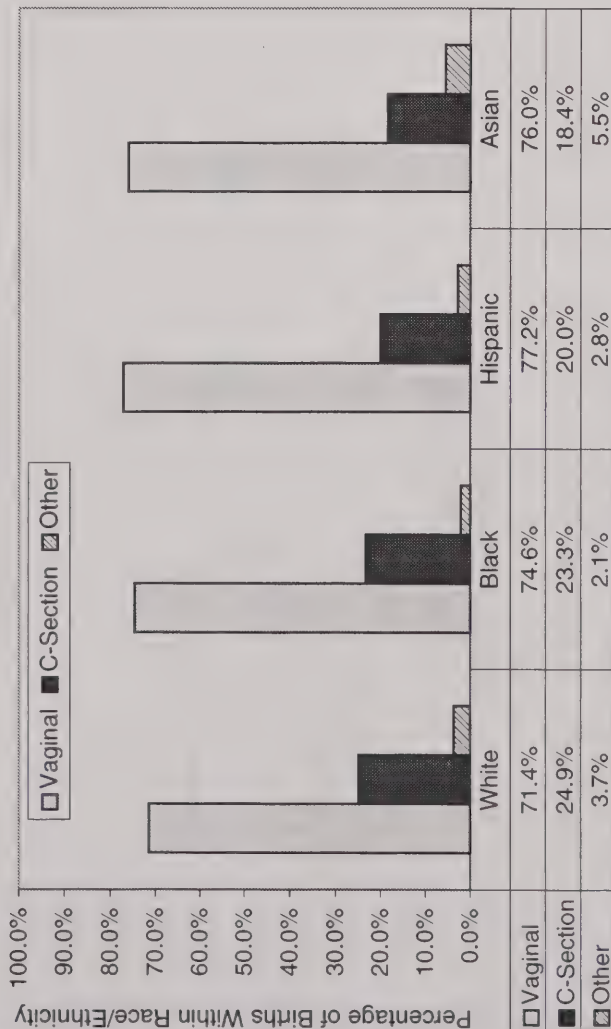
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Almost three quarters of births to Boston women during 2000 were by vaginal delivery. This was unchanged from 1999.
- Births by cesarean section accounted for 22.7% in 2000, up slightly from 20.7% in 1999.
- Other methods, such as vacuum and forceps, accounted for the remainder of deliveries.

# MATERNAL CHARACTERISTICS

## Delivery Method

**Births by Method of Delivery by Race/Ethnicity  
Boston, 2000**



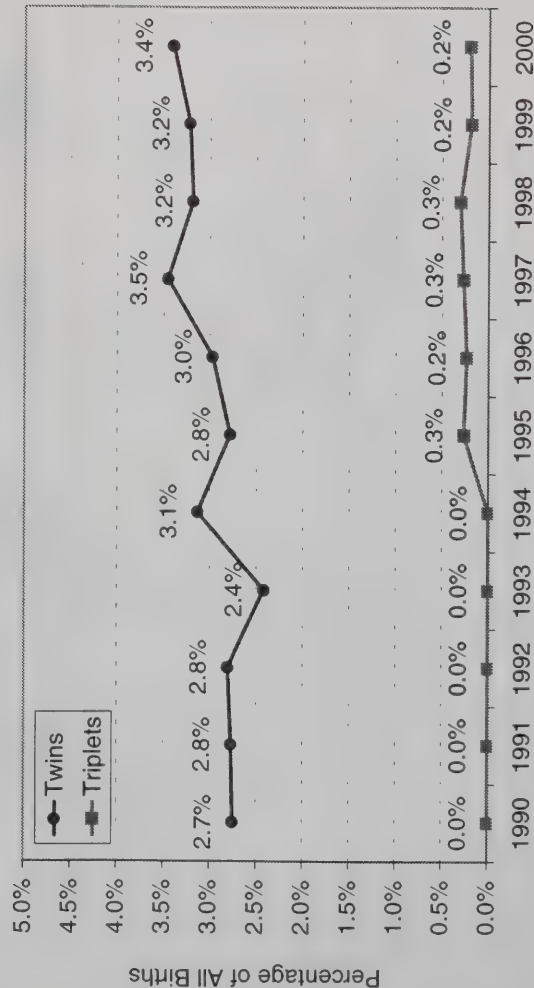
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, the majority of Boston births for all races/ethnicities were by vaginal delivery. The highest percentages of births by vaginal delivery were among Hispanic mothers (77.2%) and Asian mothers (76.0%).
- Of the births that were not by vaginal delivery, 87.8 % were by cesarean section and 12.2% by other methods such as vacuum and forceps (data not shown). Births by cesarean section were highest for Whites (24.9%) and lowest for Asians (18.4%).
- Asians had the highest percentage (5.5%) of the births that were by other methods of delivery.

## INFANT CHARACTERISTICS

### Multiple Births Trends

Multiple Births by Year  
Boston, 1990-2000



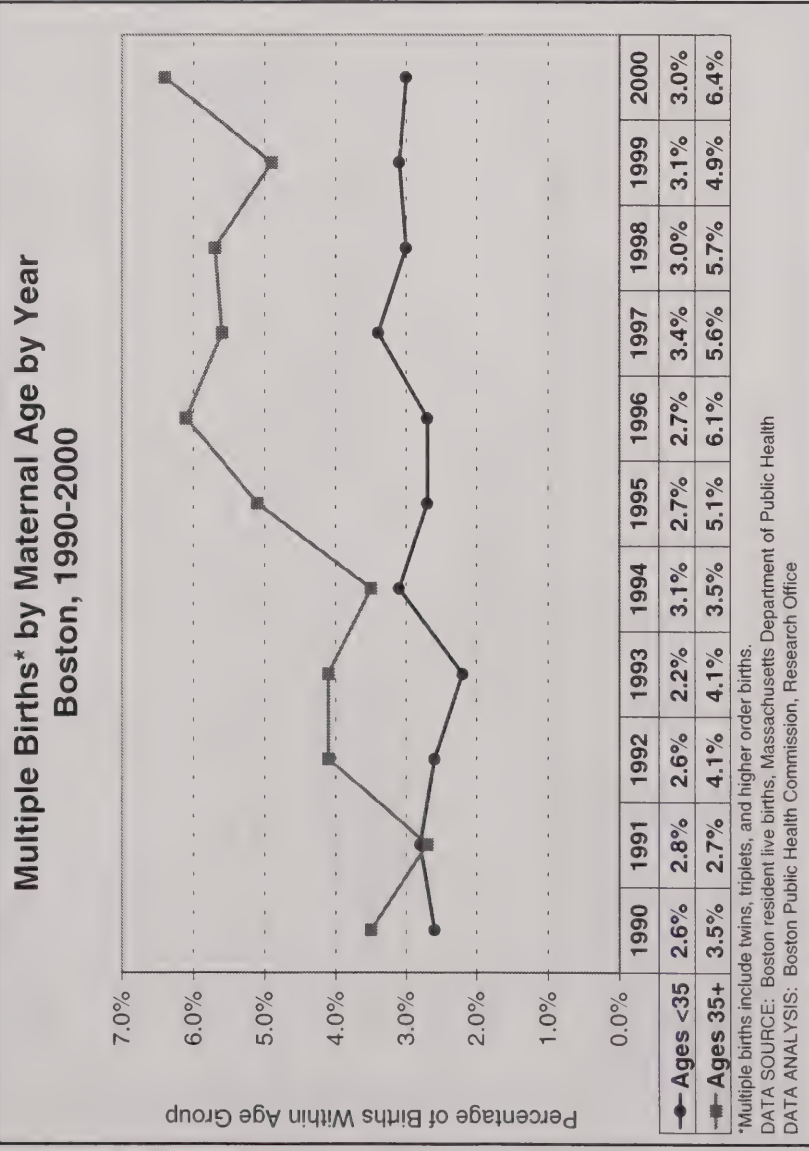
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- The overall multiple birth rate in Boston increased from 2.8% in 1992 to 3.6% in 2000.
- In Boston, in 2000, 3.4% of births were twin births, compared to 3.2% in 1999, and 2.7% in 1990. In Boston, the frequency of twin births as a percentage of all births has increased 25.9% since 1990.
- On the other hand, the percentage which were triplets rose from zero in 1990 to 0.3% in 1995 and has remained relatively stable since then.



# INFANT CHARACTERISTICS

## Multiple Births

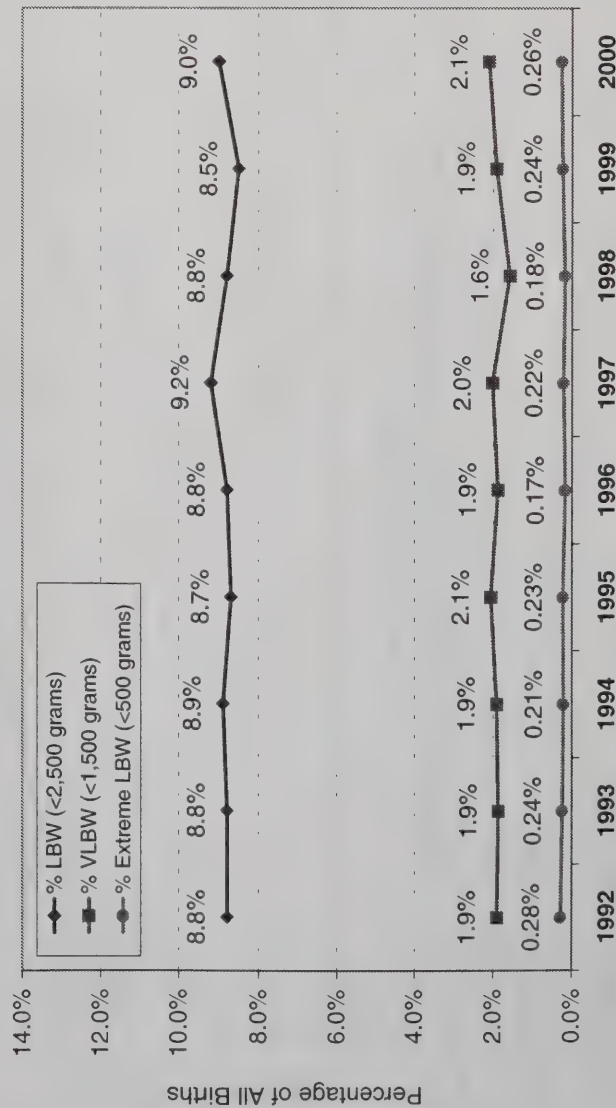


- In each year during 1990-2000, except 1991, higher percentages of births to Boston women ages 35 and over were multiple births than among those under the age of 35.
- Between 1990 and 2000, the percentage of births to women under age 35 that were multiple births increased 15.4%.
- Between 1990 and 2000, multiple births for women ages 35 and over increased 82.9%, from 4.1% in 1993 to 6.1% in 1996 and 6.4% in 2000.

# INFANT CHARACTERISTICS

## Low Birthweight

Low Birthweight Births as a Percentage of All Births  
By Weight and by Year  
Boston, 1992-2000

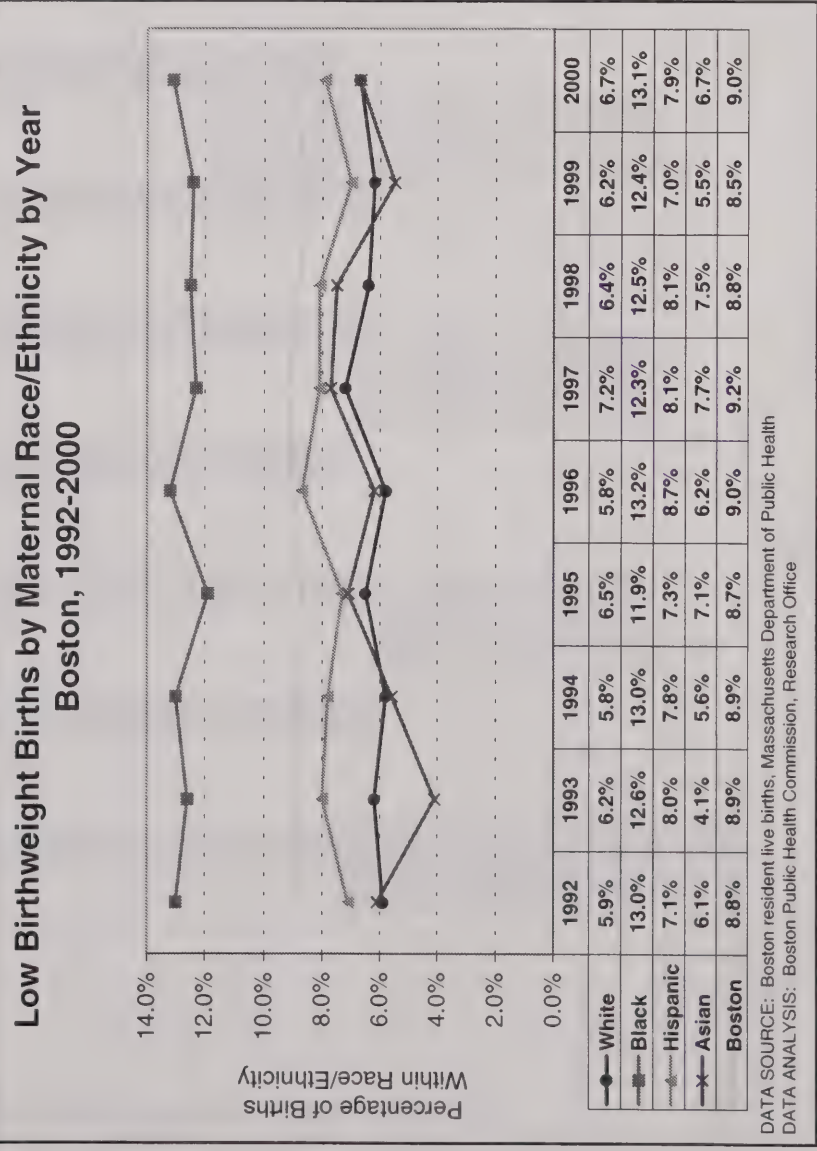


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Boston's low birthweight (LBW) rate changed little during the 1990s, reaching its lowest point in 1999 (8.5%) and its highest point, 9.2%, in 1997.
- Boston's very low birthweight (VLBW) rate fluctuated between 1.9% and 2.1% throughout the past decade, with one small drop in 1998 to 1.6%.
- The extreme low birthweight rate has also fluctuated over time but remains a very small percentage of Boston births.

# INFANT CHARACTERISTICS

## Low Birthweight



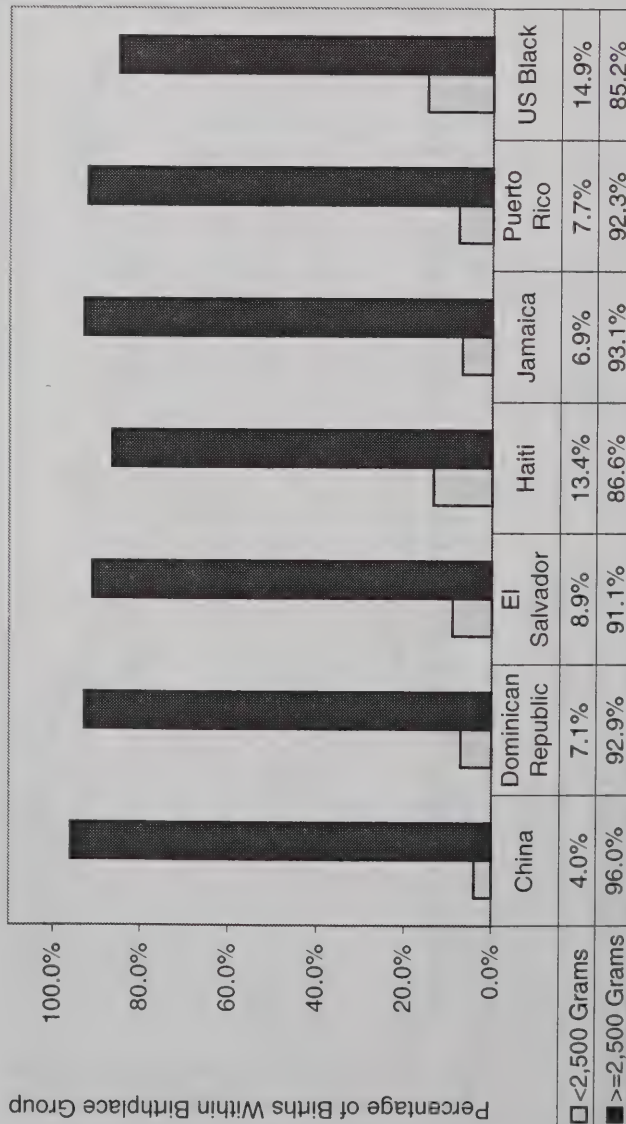
- LBW rates vary among races/ethnicities in the Boston population, with Black women having the highest LBW rates and Whites and Asians, the lowest. Despite yearly fluctuation in rates, in each of the years 1992-2000, LBW rates continued to be highest among births to Black women.
- In 2000, the LBW rate for Black women was almost double the rate for White and Asian women and almost two-thirds higher than the rate for Hispanics. All of these differences were statistically significant.
- Between 1992 and 2000, the LBW rate increased slightly (2.3%) for Boston overall, which was not a statistically significant change. The increase was larger for births to Whites (13.6%), Hispanics (11.3%), and Asians (9.8%), but none of these changes were statistically significant. The less than one percent (0.8%) increase in the Black LBW rate was not statistically significant.



## INFANT CHARACTERISTICS

### Low Birthweight

Low Birthweight Births by Maternal Birthplace  
Boston, 2000

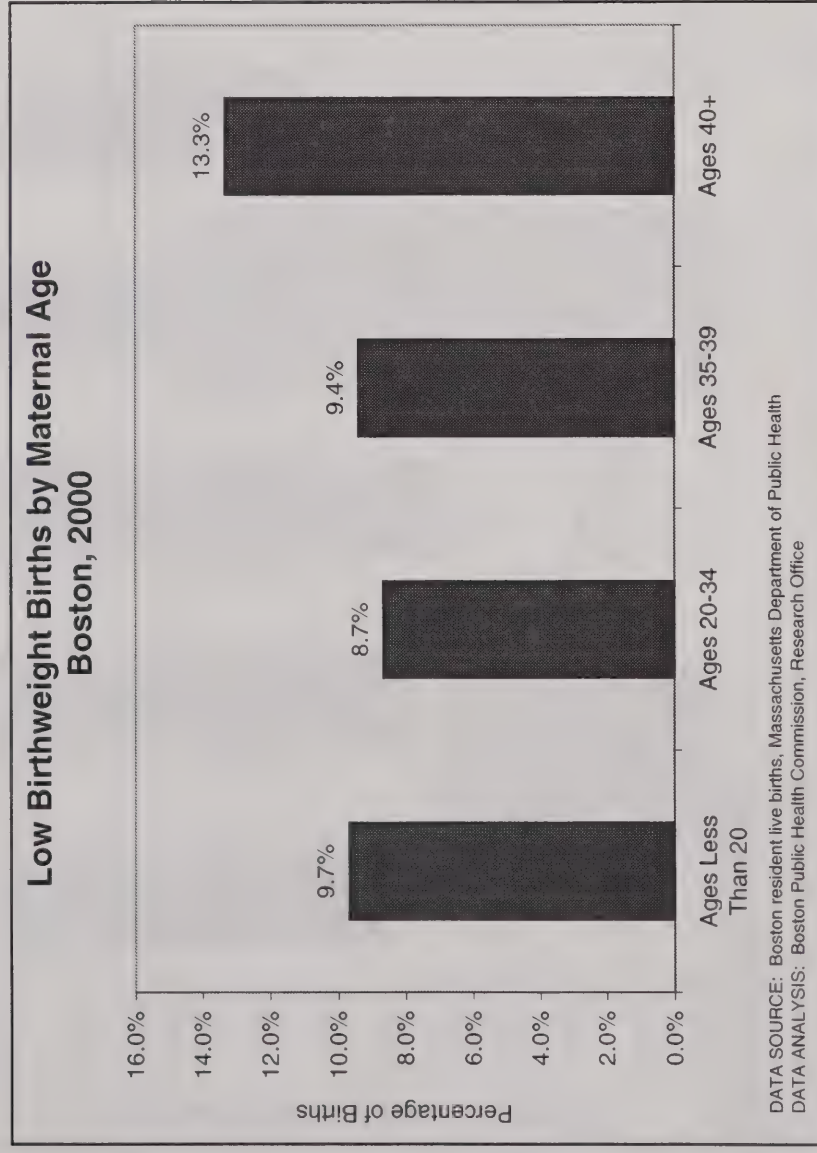


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, births to Boston women born in Haiti had a higher low birthweight rate than births to most women born in the US. They were not higher, however, than the rate of LBW births to Black women born in the US. (For these purposes, the US comprises the fifty states only; US territories are considered separately.)
- LBW rates in 2000 were lowest among births to women born in China, Jamaica, and the Dominican Republic.
- Among those born in the United States, Black women had the highest level of low birthweight births (14.9%), followed by Hispanic women (9.2%) and White women (7.4 %). There were too few low birthweight births among Asian women to calculate a rate.

# INFANT CHARACTERISTICS

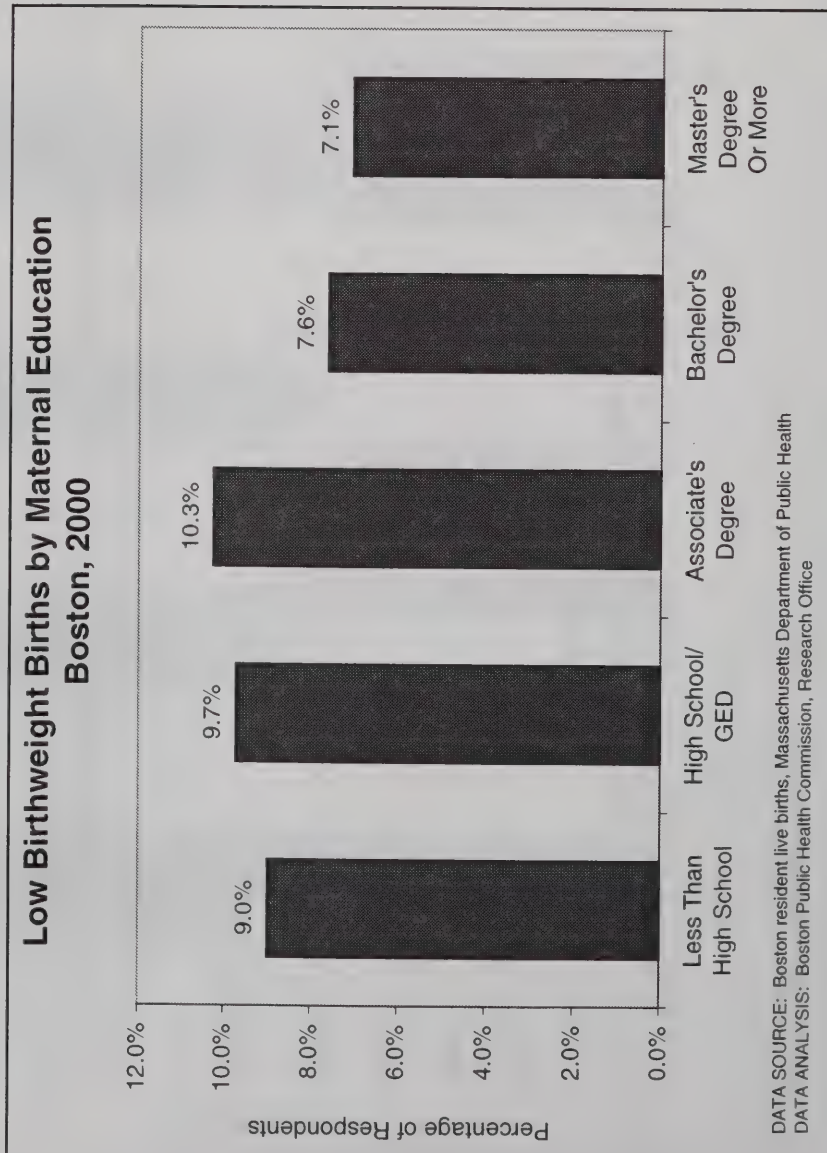
## Low Birthweight



- LBW rates in Boston are consistent with the pattern in the US, where the highest LBW rates are found among the youngest and oldest women giving birth. In Boston in 2000, the highest LBW rate was among women ages 40 and over.
- In 2000, the LBW rates for births to Boston women under 20 years of age and those ages 40 and over were higher than LBW rates for births to women between the ages of 20 and 34 and between the ages of 35 and 39. These differences are statistically significant only for the comparison between ages 40 and over and those ages 20-34.

# INFANT CHARACTERISTICS

## Low Birthweight

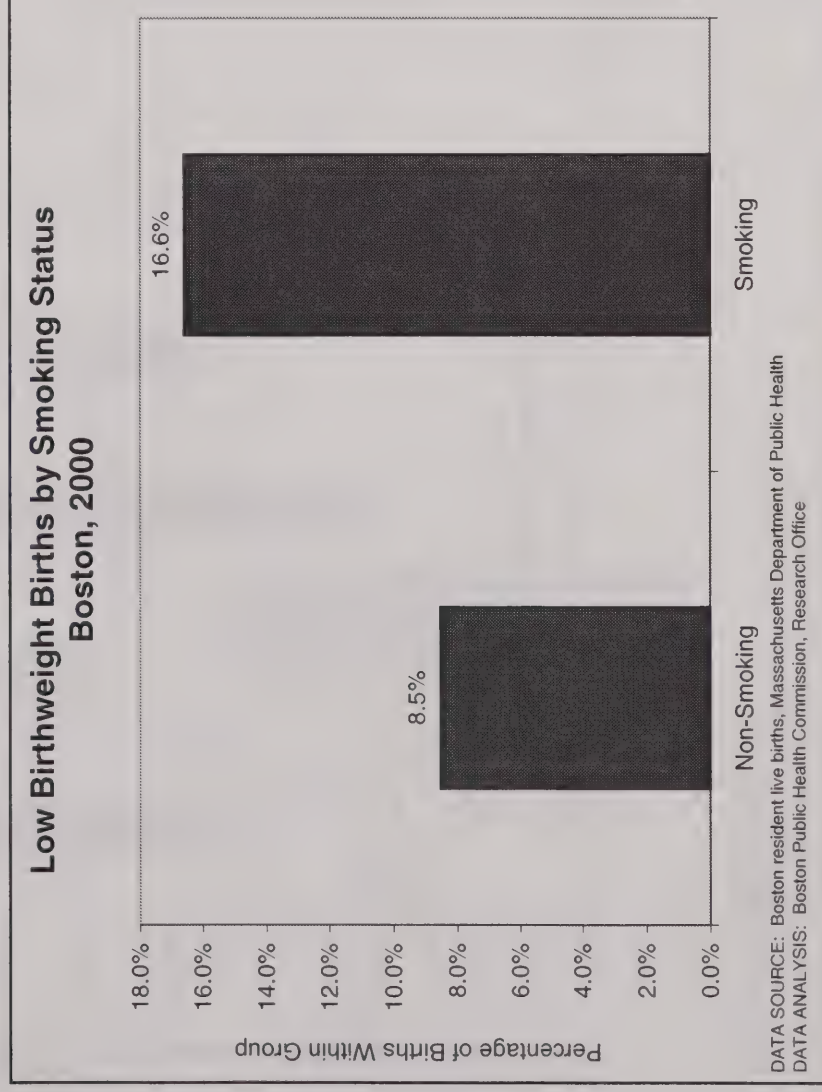


- Women with less education generally have higher rates of LBW than those with more education. However, this was not the case among women with less than a high school education in Boston in 2000.
- In Boston in 2000, 9.0% of births to women with less than a high school diploma were LBW, compared with 9.7% of births to women with a high school diploma or GED, and 10.3% of births to women with an associate's degree.



# INFANT CHARACTERISTICS

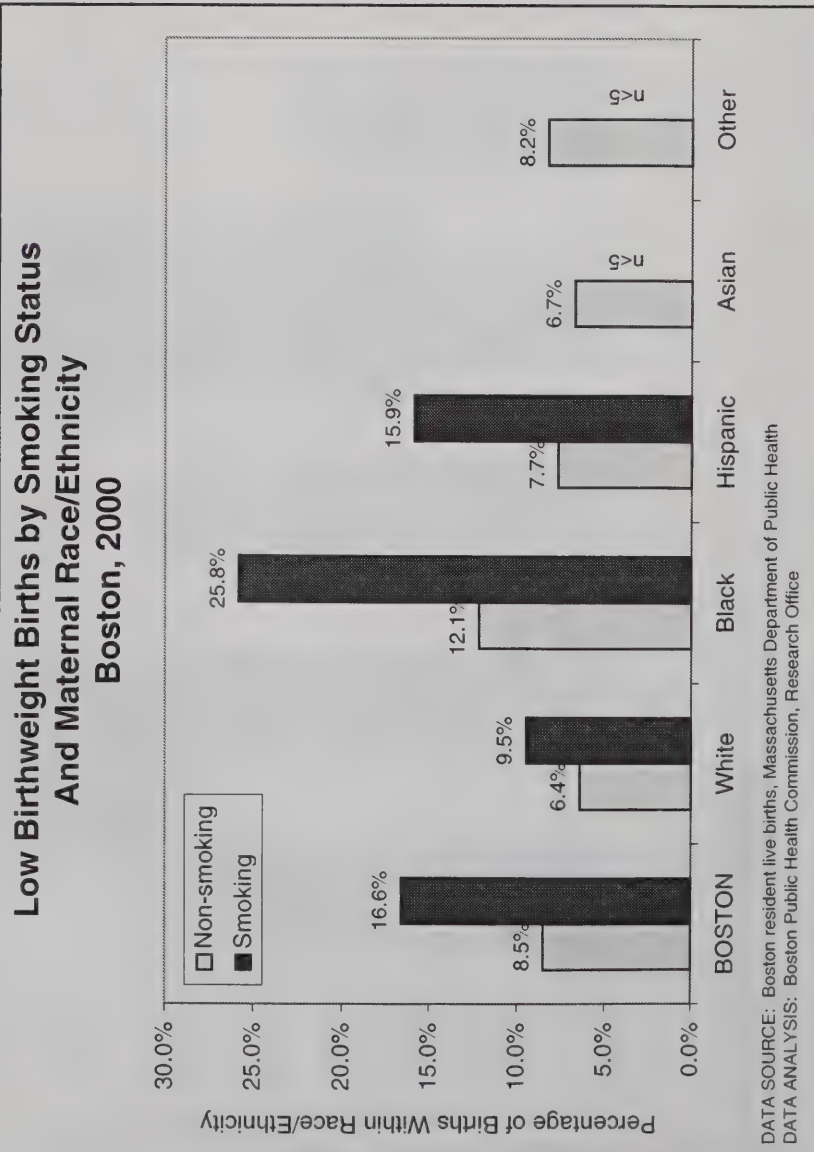
## Low Birthweight



- Tobacco use by women during pregnancy is associated with a variety of health risks, including miscarriage, intrauterine growth retardation, low birthweight, and infant mortality, as well as negative consequences for child health and development.
- In Boston in 2000, the LBW rate for the infants of women who smoked during pregnancy was 95.3% higher than the rate for infants whose mother did not smoke. This difference was statistically significant.

# INFANT CHARACTERISTICS

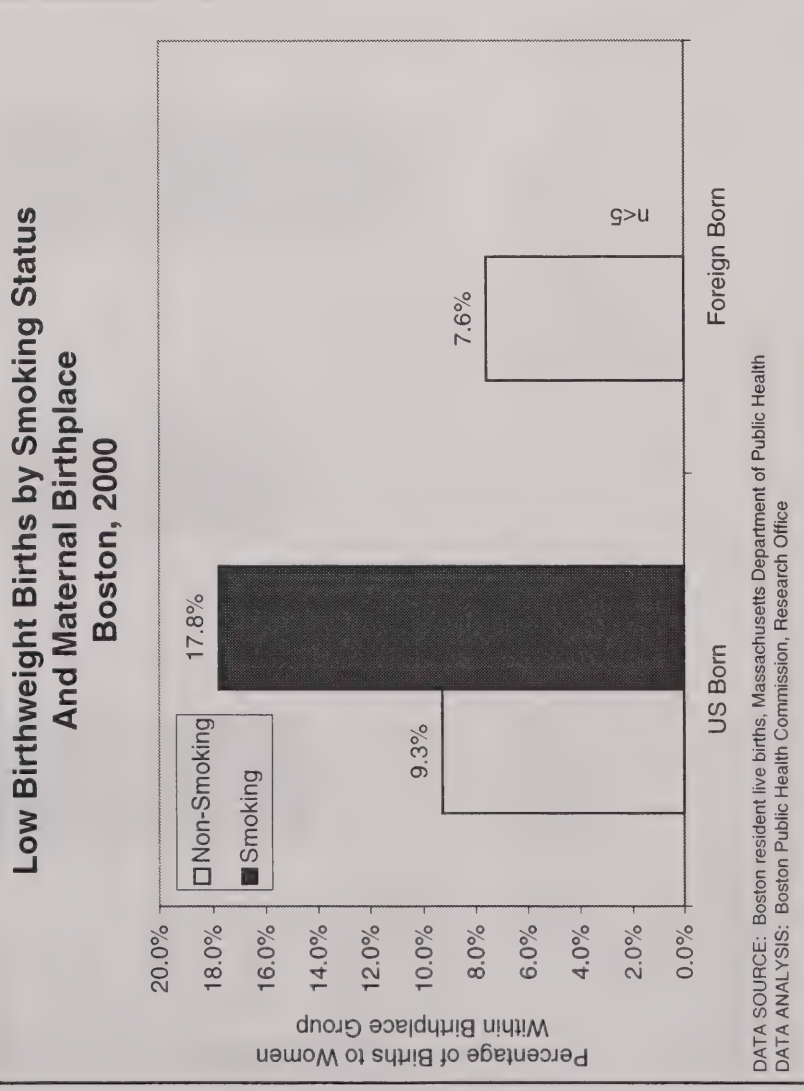
## Low Birthweight



- Among all races and ethnicities except Asians, a higher percentage of women who smoked gave birth to a low birthweight infant than those did nonsmokers.
- In 2000, among Boston women who smoked during pregnancy, a higher percentage of Black women gave birth to low birthweight infants than women of other races. Among Black Boston women who smoke, 25.8% of all births were low birthweight, and among Boston Hispanic women, 15.9% were LBW. Among Black and Hispanic women, women who smoked were more than twice as likely to give birth to low birthweight infants as women who did not smoke, a difference that was statistically significant.
- Among Asian women who smoked during pregnancy, there were too few low birthweight infants to calculate a rate.

# INFANT CHARACTERISTICS

## Low Birthweight

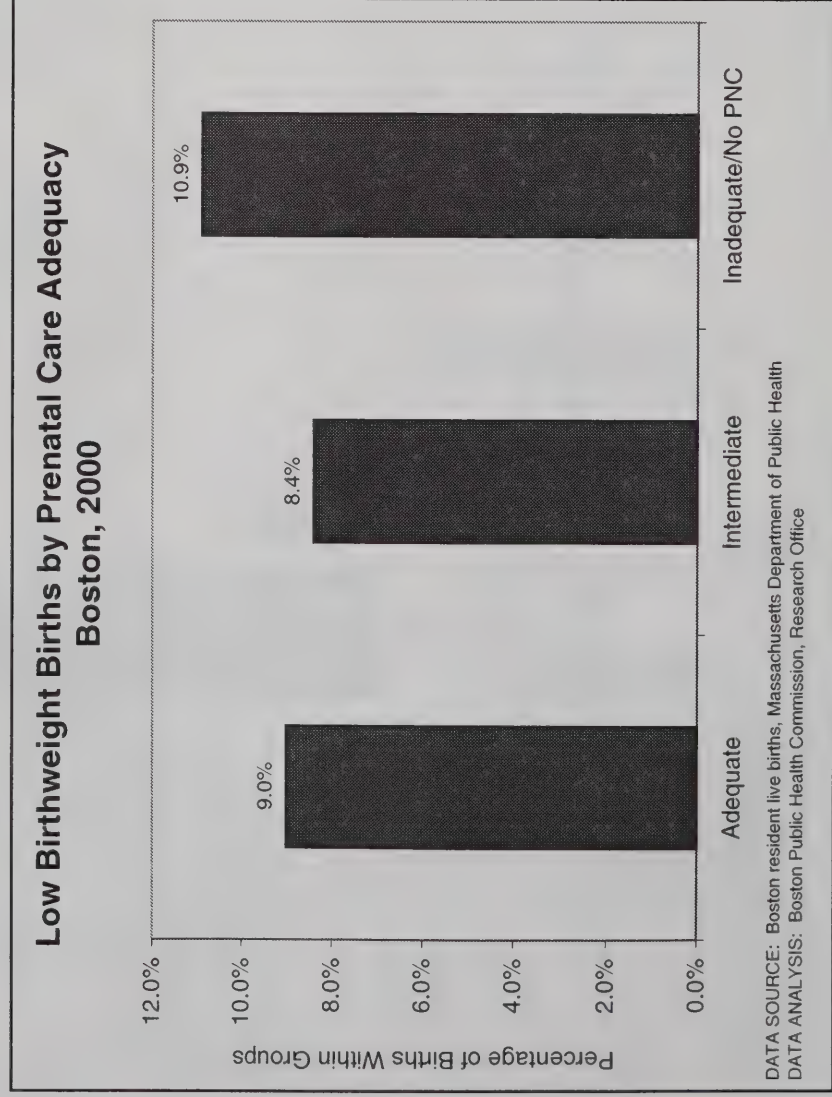


- In 2000, Boston women who reported smoking during pregnancy had a higher low birthweight rate than did women who did not report smoking during pregnancy. This difference was statistically significant.
- Of those who reported smoking during pregnancy, 17.8% of those who were US-born had LBW births; those born outside the US experienced too few LBW births to calculate a rate.



## INFANT CHARACTERISTICS

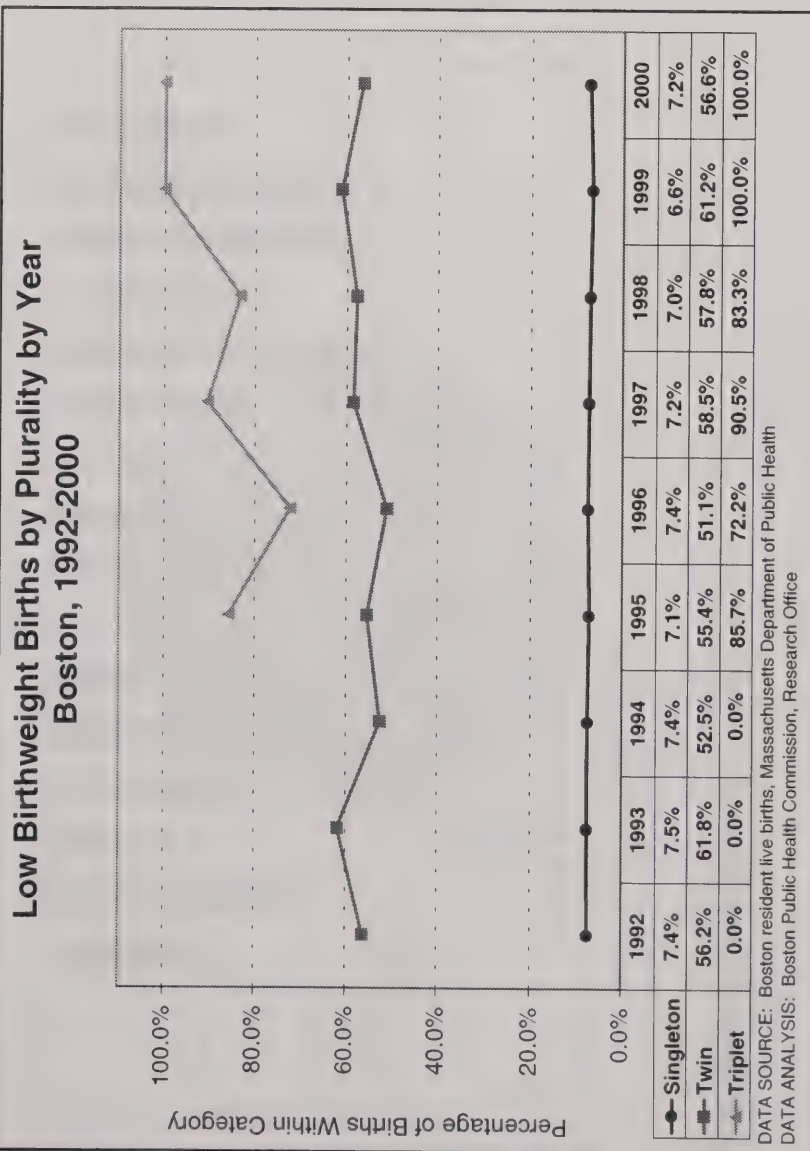
### *Low Birthweight*



- Infants born to women who do not receive adequate prenatal care have an elevated risk of low birthweight.
- In Boston in 2000, 9.0% of births to women who had adequate prenatal care were LBW, compared with 8.4% of births to women whose care was intermediate in adequacy and 10.9% of births to women who had inadequate or no prenatal care.

# INFANT CHARACTERISTICS

## Low Birthweight

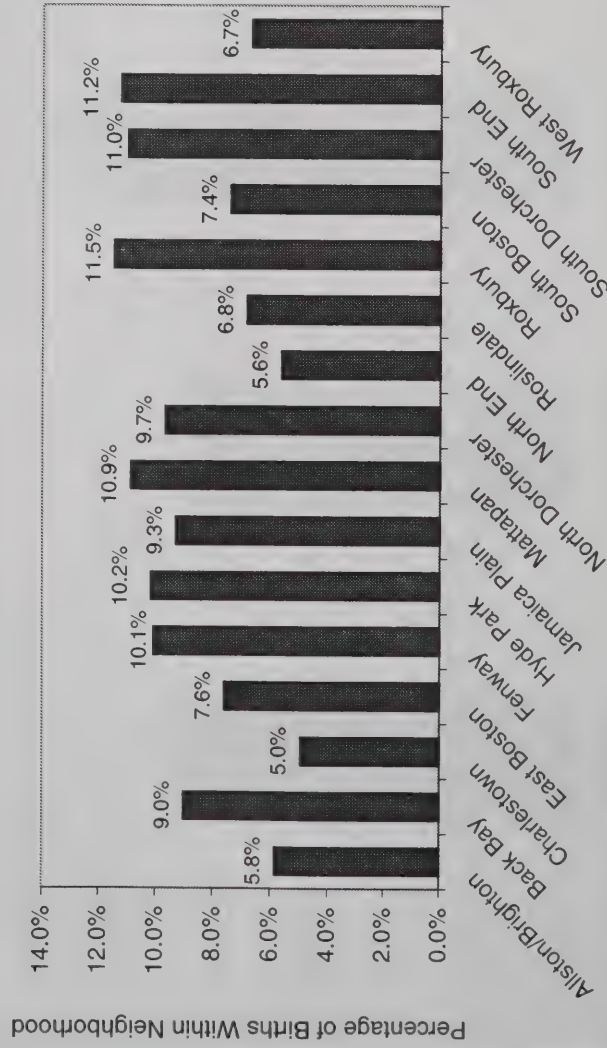


- Between 1992 and 2000, low birthweight among singletons remained above seven percent except in 1999.
- Low birthweight among twins remained between fifty and sixty-two percent of these births.
- No triplets were born to Boston residents during the years 1992 through 1994; between 1995 and 2000, the percentage of low birthweight among triplets ranged from 85.7% to 100.0%.
- There was a very small number of triplets born in Boston during these years. The number ranged from no triplet births during the years 1992-1994 to 7 or fewer triplet births in each of the remaining years.

# INFANT CHARACTERISTICS

## Low Birthweight

Low Birthweight Births by Neighborhood  
Boston, 2000



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

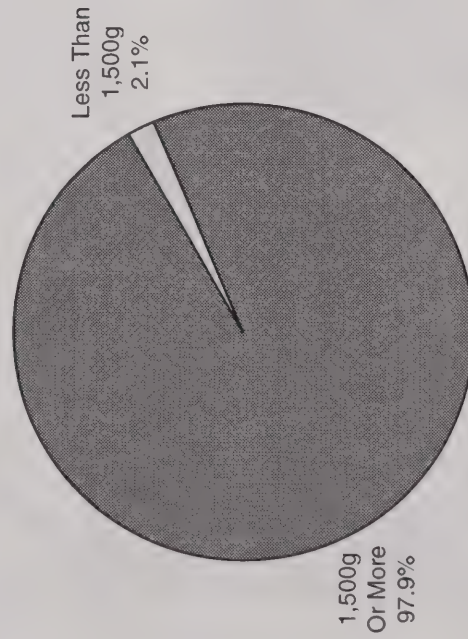
- Boston's highest rates of LBW in 2000 were among residents of Roxbury, the South End, and South Dorchester. The city's lowest rates were among residents of Charlestown, the North End, and Allston/Brighton.



## INFANT CHARACTERISTICS

### *Very Low Birthweight*

**Very Low Birthweight Births  
Boston, 2000**



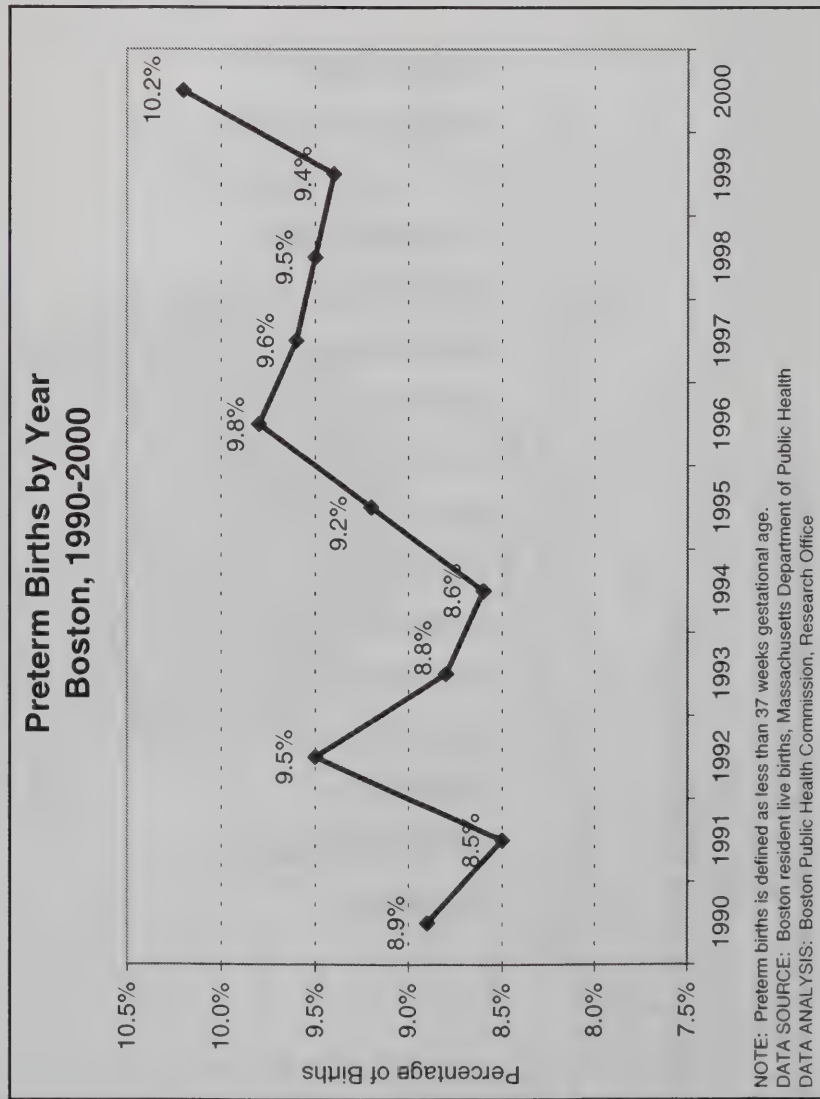
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Very low birthweight (VLBW) is defined as a weight of less than 1,500 grams, or 3.3 pounds, at delivery.
- In Boston in 2000, 167 births (2.1%) were VLBW.
- Very low birthweight among Boston births has changed little in recent years, fluctuating from a rate as low as 1.6% (in 1998) to a rate as high as 2.1% in 2000.

## INFANT CHARACTERISTICS

### Preterm Birth

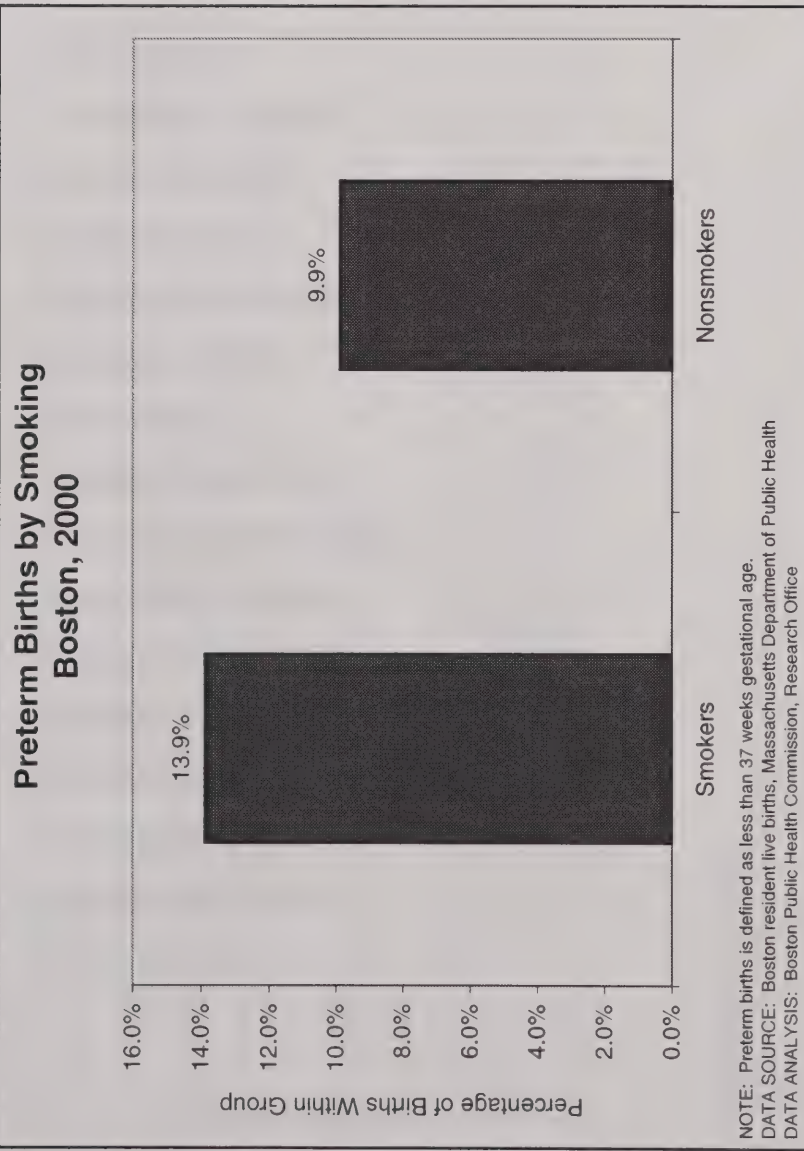
A preterm birth (PTB) is one that occurs at a gestational age of less than 37 completed weeks. Infants that have been born too early are at substantially increased risk of infant death, and the earlier they are born the higher their risk of dying before their first birthday. Preterm birth and low birthweight are highly correlated, with very similar race/ethnicity, age, prenatal care adequacy, and insurance status patterns.



- From 1990 through 2000, preterm births fluctuated yearly, from a low of 8.5% in 1991 to a high of 10.2% in 2000.
- Between 1990 and 1994, the percentage of preterm births declined from 8.9% to 8.6%, but increased during 1995 and 1996 before declining again until 2000.

# INFANT CHARACTERISTICS

## Preterm Birth



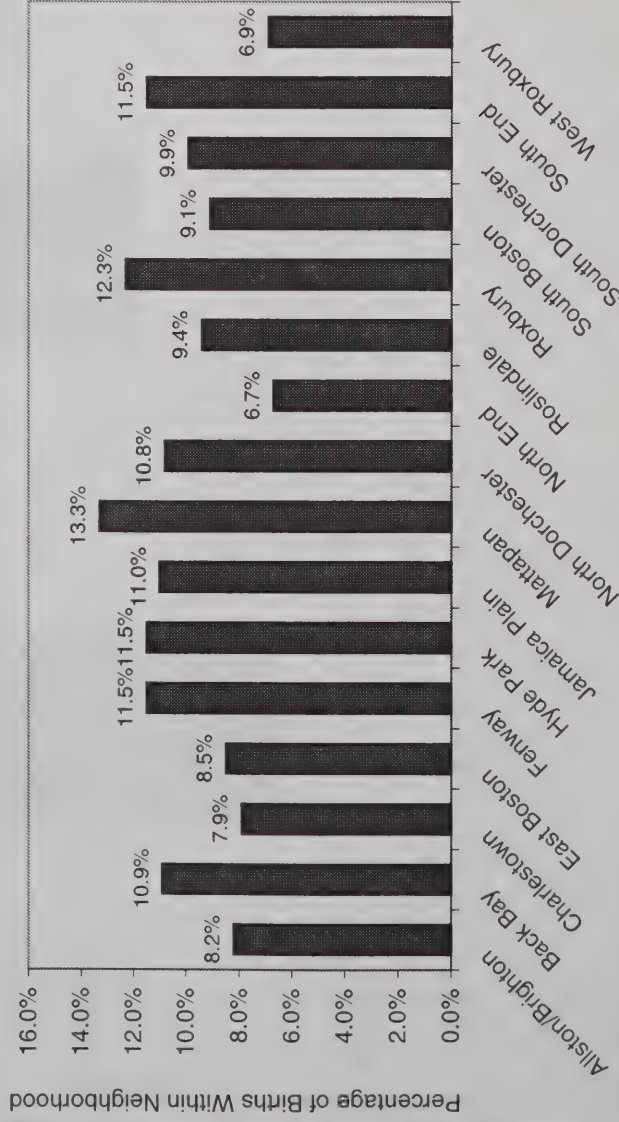
- In Boston in 2000, the rate of preterm birth among women who smoked was 40.4% higher than the rate among women who did not smoke, a statistically significant difference.



# INFANT CHARACTERISTICS

## Preterm Birth

Preterm Births by Neighborhood  
Boston, 2000



- Mattapan, with 44 preterm births (13.3% of its births), had the highest preterm birth (PTB) rate of all Boston neighborhoods. Roxbury, the South End, the Fenway, Hyde Park, Jamaica Plain, and the Back Bay also had high PTB rates. The North End and West Roxbury had the lowest PTB rates of all Boston neighborhoods.

NOTE: Preterm births is defined as less than 37 weeks gestational age.  
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

## LOGISTIC REGRESSION ANALYSIS

### *Introduction*

The descriptive statistics (numbers, percentages, and rates) presented in BPHC annual health reports are useful in their capacity to portray individual characteristics (for example, low birthweight, the prevalence of smoking during pregnancy, or the adequacy of prenatal care). However, they are limited in their ability to look at multiple characteristics at one time. Yet this capacity is often of value in comparing one group with another or examining changes over time. It requires the ability to assess the importance of one factor as though other relevant factors were the same in each group, thus making the groups comparable to one another. To achieve this, multivariate statistical techniques such as logistic regression are used.

Logistic regression is a type of mathematical modeling that produces an estimate of the odds of having a particular outcome (for example, a low birthweight birth) given that someone has a particular characteristic (for example, smoking during pregnancy), versus the odds of having a low birthweight birth given that she does not smoke during pregnancy. It estimates these odds, and the ratio of one to the other, while controlling for other relevant factors, such as age, race, type of insurance, place of birth, or education. Thus the resulting statistic, the odds ratio, compares the two groups—smokers and nonsmokers—and their likelihood of having a low birthweight birth as though they were identical in age, race, education, and so on.

In this example, when the odds of having a low birthweight birth are not roughly equal for smokers and nonsmokers, the magnitude of the difference between them is assessed statistically, and if it is very unlikely to have been due to chance, the finding is considered statistically significant.

Like all statistical techniques, logistic regression has inherent limitations. Although this method can help to identify a likelihood that the selected outcome and variables of interest are present together, it does not define which caused the other to occur or whether there is any causal relationship between them. Another limitation that exists when using the Boston birth data is the number and nature of the variables that can be used in a logistic regression model. If a variable of interest is rare within the group being studied, or if the group itself is small, this makes the groups more difficult to compare since a difference is less noticeable statistically. For this reason, logistic regression may fail to identify small but real differences between groups.

## LOGISTIC REGRESSION ANALYSIS

### *Results*

For this report the two outcomes that have been selected for analysis are (1) bearing a child of low birthweight (less than 2,500 grams) and (2) receiving adequate prenatal care.

#### *Low Birthweight*

A strong predictor of low birthweight is plurality, or the number of children born from the same pregnancy. When logistic regression statistically adjusts for differences between racial and ethnic groups, smoking status, maternal birthplace, marital status, age, parity, and insurance type, Boston women having a multiple pregnancy are about 22.7 times as likely to have a child of low birthweight as are mothers of singletons.

Another important predictor of very low birthweight in Boston is race/ethnicity. Black women are 2.3 times as likely to have a child of low birthweight as White women. Also, Hispanic women are 1.7 times as likely to have a child of low birthweight as White women. Asian women and women of other races are one and a half times as likely to have a child of low birthweight birth as White women.

Other characteristics that are related to the outcome of low birthweight are smoking during pregnancy, marital status, insurance type, and maternal birthplace. Women who smoke during pregnancy, women who are unmarried, or women who have public insurance have a higher chance of having a low birthweight birth than non-smokers, married women, or having private insurance. Women who are born outside the US are less likely to have a low birthweight birth than women born in the US.

Other characteristics related to low birthweight are maternal age and parity (the number of live births). Women ages 20-24 years or women for whom this is the second live birth are less likely to have a low birthweight birth than women ages 25-34 years or women for whom it is their first live birth.

Other characteristics that were tested in the model but had no predictive value were adequacy of prenatal care, gravidity, and mother's education.

#### *Adequacy of Prenatal Care*

A predictor that women will obtain adequate prenatal care is plurality (the number of children born from the same pregnancy). Boston women who gave birth to twins or more are one and a half times more likely to obtain adequate prenatal care than women who had singleton births.



## LOGISTIC REGRESSION ANALYSIS

Women who smoke during pregnancy, women who are born outside the US, or women who are unmarried are less likely to receive adequate prenatal care than women who do not smoke during pregnancy, women born in the US, or married women. Also, women who have public insurance are less likely to obtain adequate prenatal care than women who have private insurance.

Other characteristics related to the outcome of adequate prenatal care are race/ethnicity, mother's education, and parity (the number of live births). Black women are less likely than White women to obtain adequate prenatal care, whereas Hispanic women are 1.3 times more likely to obtain adequate prenatal care than White women. Women with less than a high school education and women who have had four or more live births are less likely to obtain adequate prenatal care than women who are high school graduates or women having their first birth.

Other characteristics that were tested in the model but had no predictive value were the mother's age and gravidity.

LOGISTIC REGRESSION ANALYSIS

Adjusted Odds Ratios for Low Birthweight  
Boston, 2000

Race/Ethnicity	Low Birthweight (<2,500 grams)		
	Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
White, Non-Hispanic <sup>†</sup> Black, Non-Hispanic Hispanic Asian/Pacific Islander and Other	1.00		
	2.31	1.83	2.92
	1.70	1.22	2.37
Plurality	1.58	1.18	2.12
Smoking During Pregnancy	1.00		
	22.69	17.39	29.62
Maternal Birthplace	1.00		
	1.98	1.49	2.64
Marital Status	1.00		
	0.68	0.55	0.83
Maternal Age	1.00		
	1.31	1.06	1.62
	1.00		
Parity	1.00		
	0.78	0.58	1.04
	0.72	0.56	0.93
Insurance	1.18	0.92	1.50
	1.00		
First Live Birth <sup>†</sup> Second Live Birth <sup>†</sup> Three or More Live Births <sup>†</sup>	1.00		
	0.74	0.61	0.90
	0.75	0.56	1.00
Private Insurance <sup>†</sup> Public Insurance <sup>†</sup>	1.00		
	1.31	1.07	1.60

<sup>†</sup>Reference group includes US territories  
NOTE: The following variables were included in the original model, but excluded because they did not attain statistical significance: adequacy of prenatal care, gravidity, and maternal level of education.  
DATA SOURCE: Boston resident births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

## LOGISTIC REGRESSION ANALYSIS

Adjusted Odds Ratios for Adequate Prenatal Care  
Boston, 2000

	Adequate Prenatal Care		
	Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
<b>Race/Ethnicity</b>			
White, Non-Hispanic <sup>†</sup>	1.00		
Black, Non-Hispanic	0.75	0.64	0.88
Hispanic	1.28	1.06	1.55
Other	0.89	0.67	1.20
Asian/Pacific Islander	0.81	0.65	1.02
<b>Plurality</b>			
Singleton <sup>†</sup>	1.00		
Twins or Higher	1.52	1.10	2.15
<b>Smoking During Pregnancy</b>			
No <sup>†</sup>	1.00		
Yes	0.62	0.50	0.76
<b>Maternal Birthplace</b>			
US <sup>†</sup>	1.00		
Foreign <sup>‡</sup>	0.71	0.63	0.81
<b>Marital Status</b>			
Married <sup>†</sup>	1.00		
Unmarried	0.87	0.76	0.99
<b>Maternal Educational Attainment</b>			
High School Graduate/GED <sup>†</sup>	1.00		
<High School	0.58	0.50	0.67
Associate Degree	0.95	0.82	1.12
Four-Year College Degree or Higher	1.02	0.85	1.21
<b>Parity</b>			
First Live Birth <sup>†</sup>	1.00		
Second or Third Live Birth	0.96	0.85	1.07
Fourth or More Live Births	0.46	0.36	0.60
<b>Insurance</b>			
Private Insurance <sup>†</sup>	1.00		
Public Insurance	0.42	0.36	0.48

<sup>†</sup>Reference group

<sup>‡</sup>Includes US territories

NOTE: The following variables were included in the original model, but excluded because they did not attain statistical significance: gravidity and maternal age.

DATA SOURCE: Boston resident births, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission, Research Office



## LOGISTIC REGRESSION ANALYSIS

### *Conclusions*

Non-singleton births, smoking during pregnancy, Blacks, Hispanics, and Asian/Other race, being unmarried, and having public insurance are each associated with a significantly elevated likelihood of having a low birthweight birth. Women who are born outside the US and women with a previous live birth had significantly lower likelihood of having a low birthweight birth.

Smoking during pregnancy, being born outside the US, being unmarried, and not having private health insurance are associated with less adequate prenatal care. Non-singleton births and Hispanic ethnicity are each associated with a higher likelihood of obtaining adequate prenatal care.

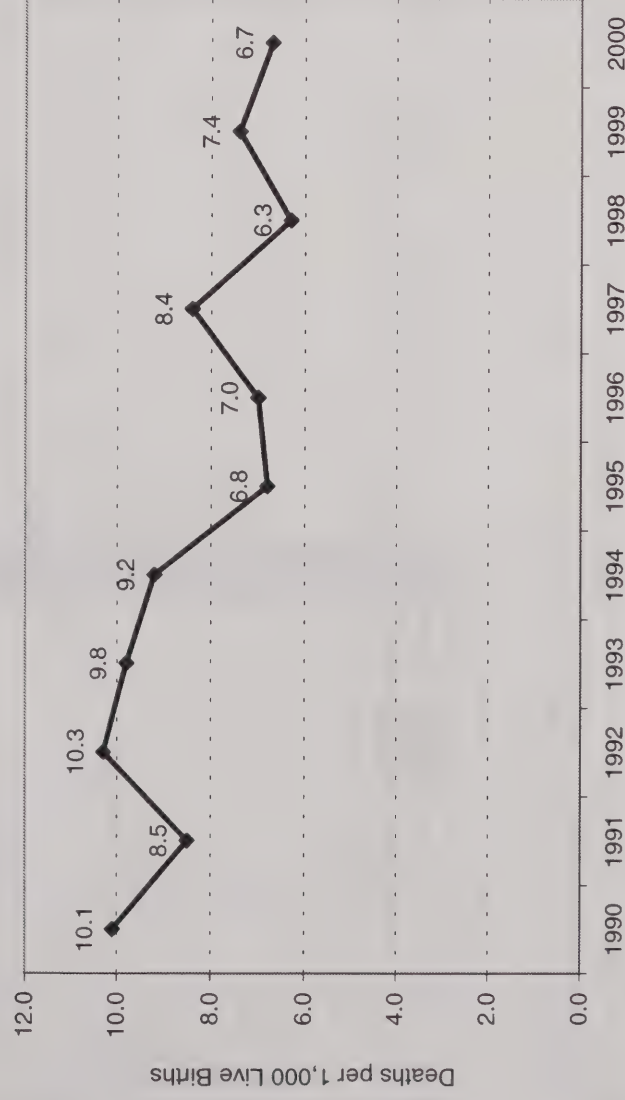
The limitations of logistic regression may obscure the larger picture of the relationship between these characteristics of women giving birth and the likelihood of low birthweight. As mentioned earlier, some variables were eliminated from the model because there were too few subjects to provide statistical evidence of an association. Other variables which may be associated with the outcome were not investigated for a variety of reasons. For example, smoking is a valuable risk factor in its own right, but it is possible that smokers behave in other risky ways that cannot be measured in the vital records data. For reasons such as these, results must be interpreted as only part of a larger picture in the explanation of birth outcomes.

## INFANT MORTALITY

### Trends

Infant mortality is the death of an infant age 364 days or younger. Several causes contribute to infant mortality. Among them are congenital anomalies, respiratory distress, low birthweight (LBW), maternal pregnancy complications, lack of access to health care, and socioeconomic status (SES). The infant mortality rate (IMR) is an important measure of the well-being of infants, children, and pregnant females. Despite yearly fluctuations, IMRs are generally highest among infants born to adolescents and to women ages 35 and over. Rates differ among races/ethnicities, with Blacks (see the section *Disparities in Infant Mortality by Race/Ethnicity*) having the highest rates and Whites and Hispanics the lowest.

**Infant Mortality Rates by Year  
Boston, 1990-2000**

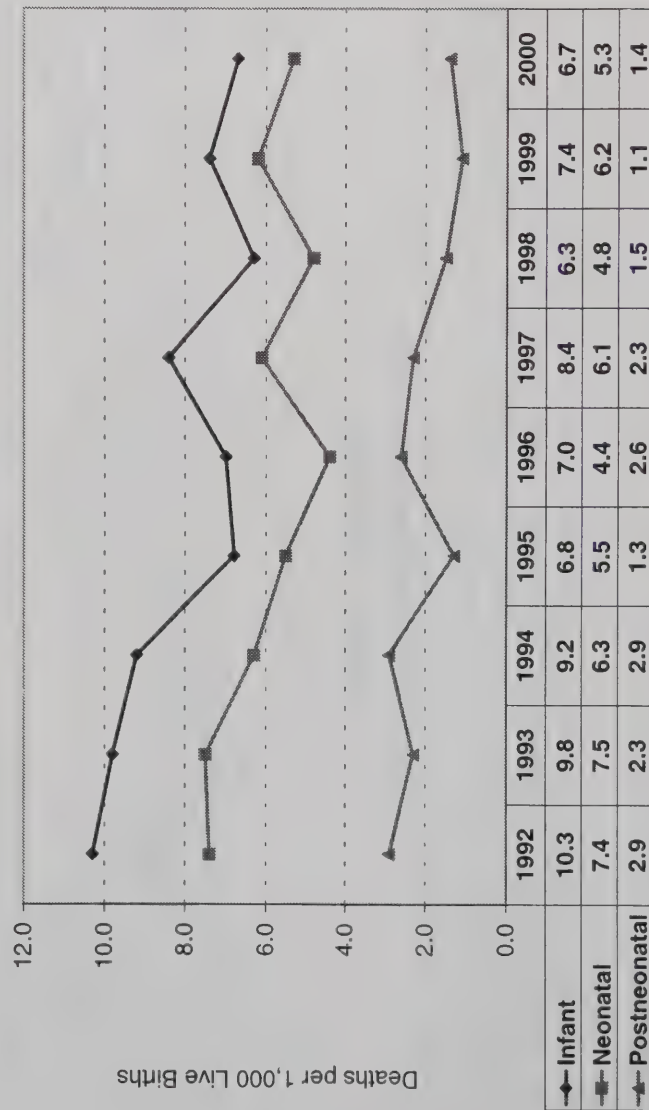


DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 2000, there were 54 infant deaths in Boston, an infant mortality rate (IMR) of 6.7 deaths per 1,000 live births.
- The 2000 Boston IMR was 9.5% lower than the 1999 IMR of 7.4.
- The highest IMR during the period 1990-2000 occurred in 1992 (10.3 infant deaths per 1,000 live births).

# INFANT MORTALITY

Infant Mortality Rates by Age of Infant at Death by Year  
Boston, 1992-2000

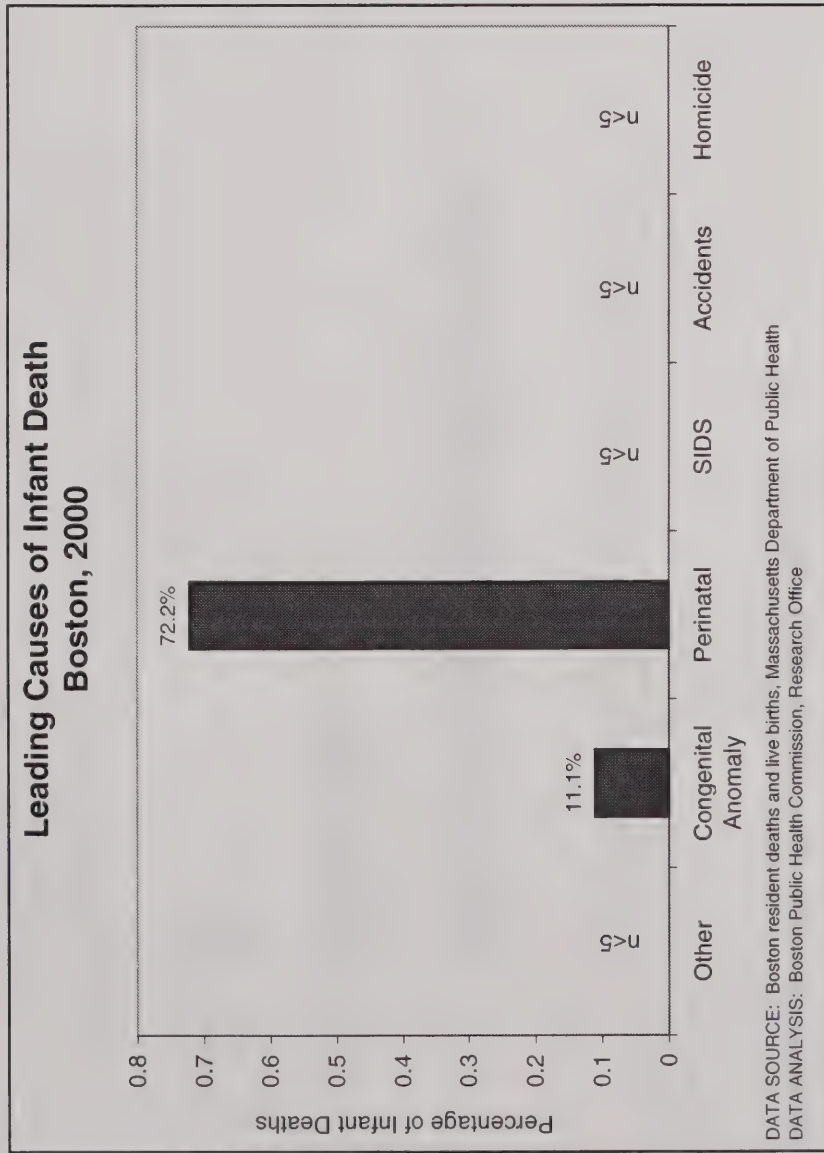


DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Most infant deaths in Boston occur in the neonatal period (infants under 28 days of age). Of the 54 Boston infant deaths during 2000, 79.6% occurred in the neonatal period, a decrease of 7.9% from 1999. This decrease was not statistically significant.
- From 1992 to 2000, there was a 28.4% decrease in Boston's neonatal mortality rate, from 7.4 deaths per 1,000 births in 1992 to 5.3 deaths per 1,000 births in 2000. This decrease was not statistically significant.
- Between 1999 and 2000, neonatal mortality rate decreased 14.5%, from 6.2 deaths per 1,000 live births in 1999 to 5.3 deaths per 1,000 live births in 2000. This decrease was not statistically significant.
- From 1992 to 2000, the postneonatal mortality rate (deaths occurring between 28 days and 364 days of age) decreased 51.7%, from 2.9 deaths per 1,000 live births in 1992 to 1.4 deaths per 1,000 live births in 2000. The postneonatal mortality rate was lowest in 1999. Between 1999 and 2000, the postneonatal mortality rate increased 27.3%. These results were not statistically significant.



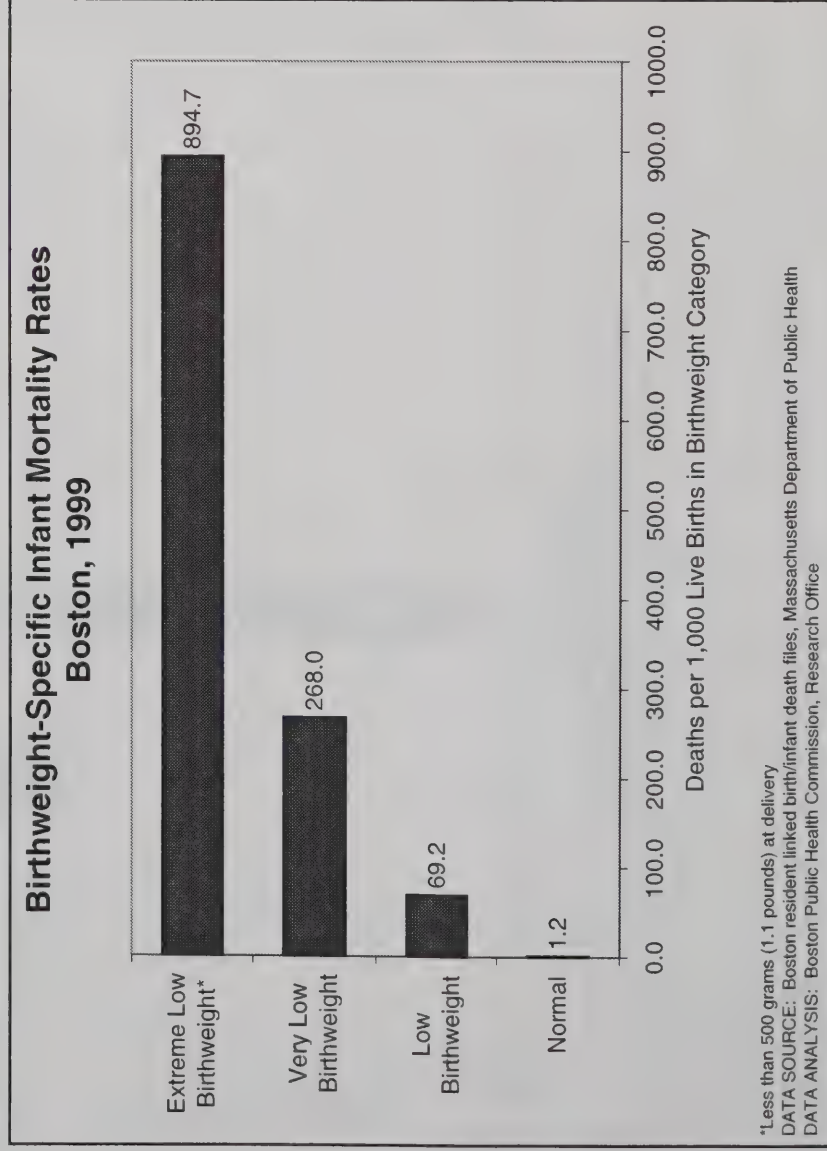
# INFANT MORTALITY



- In 2000, the majority of infant deaths in Boston was due to perinatal conditions (72.2%), which include respiratory distress syndrome and conditions related to prematurity. The second leading cause of infant death is congenital anomalies, which includes congenital malformation of organs and chromosomal abnormalities. There were fewer than five infant deaths due to sudden infant death syndrome (SIDS), accidents, homicide, or miscellaneous other causes.

## INFANT MORTALITY

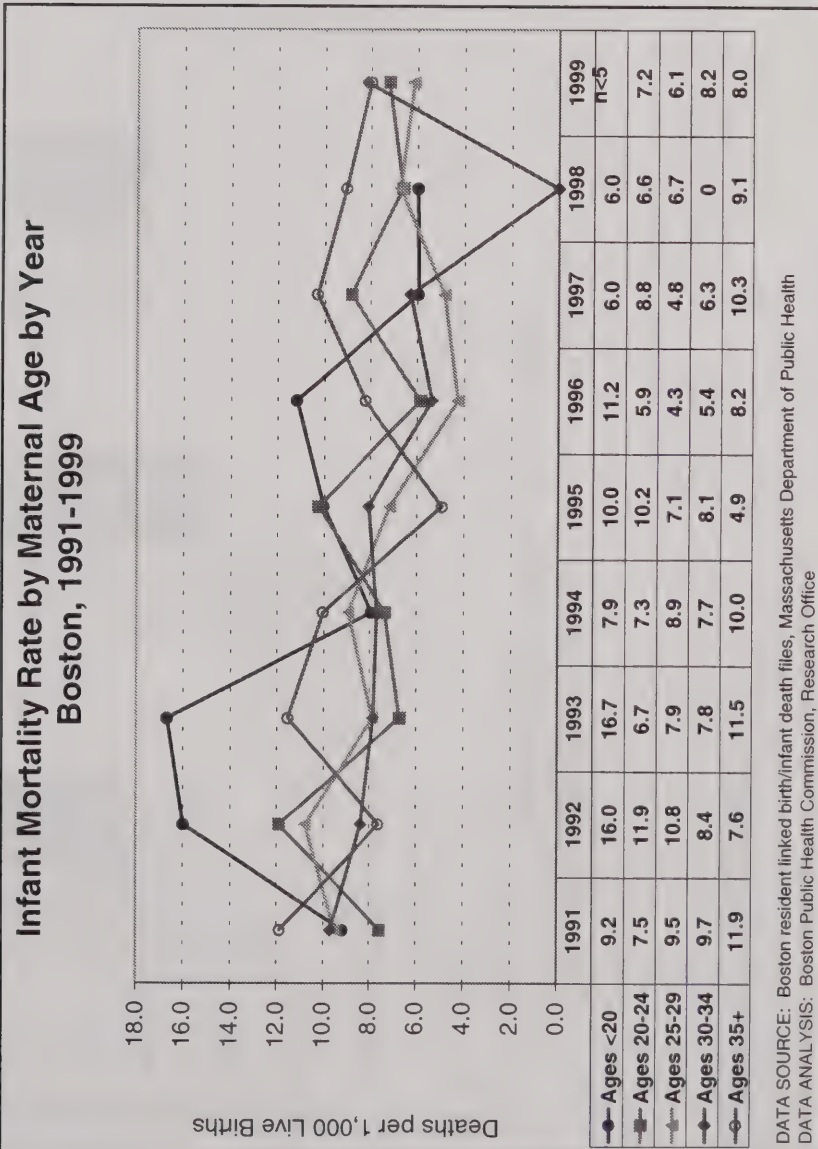
### *Birthweight-Specific Mortality*



- The IMR increases as birthweight decreases, resulting in IMRs being highest for extremely low birthweight infants: 89.5% of Boston infants weighing less than 1.1 pounds at birth do not survive, while only about one in one thousand normal birthweight infants die before the first birthday.
- In 1999, the IMR for low birthweight infants was 57.7 times as high as the IMR for those of normal birthweight, the IMR for very low birthweight infants was 223.3 times as high as the IMR for LBW infants, and the IMR for extremely low birthweight infants was 745.6 times as high as the IMR for normal birthweight infants.

# INFANT MORTALITY

## Maternal Age



- Despite yearly fluctuations, IMRs generally were higher among infants born to adolescents under age 20 and to women ages 35 and over than to women of other ages.
- Between 1991 and 1999, IMRs declined for infants born to women in every age group. There were too few infant deaths in 1999 for infants of adolescents under age 20 to calculate an IMR, but between 1991 and 1998, their IMR declined 34.8%. This decline was not statistically significant.
- Rates declined the most among women ages 25-29 (35.8%) and those ages 35 and over (32.8%). The IMR among infants of mothers ages 20-24 declined the least, 4.0%. This decline was not statistically significant.

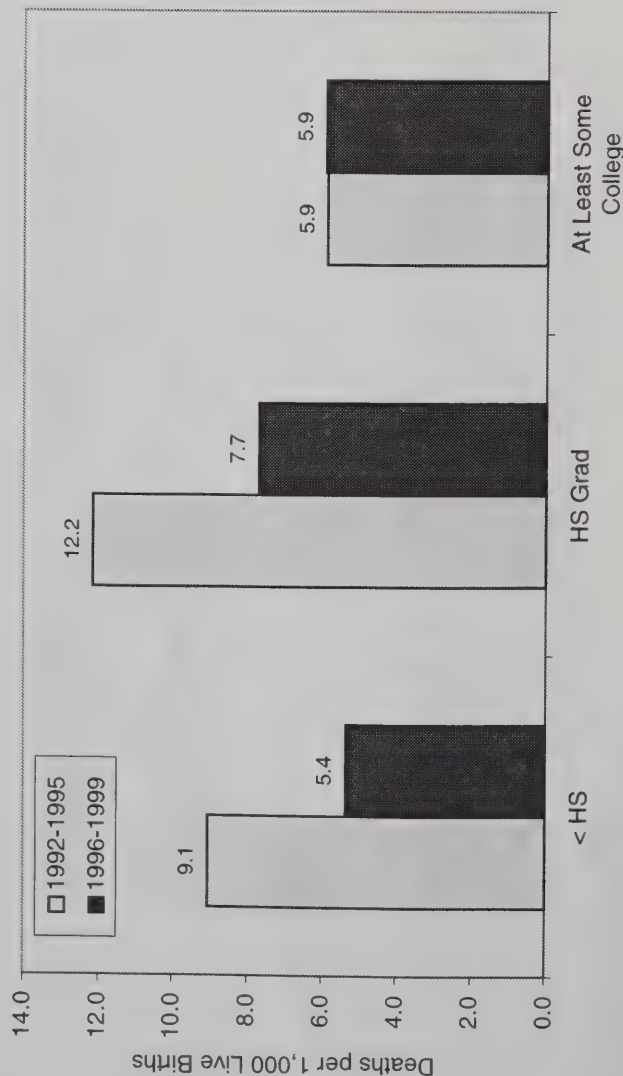
DATA SOURCE: Boston resident linked birth/infant death files, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office



# INFANT MORTALITY

## Maternal Education

**Infant Mortality Rate by Maternal Education  
Boston, 1992-1995 and 1996-1999**

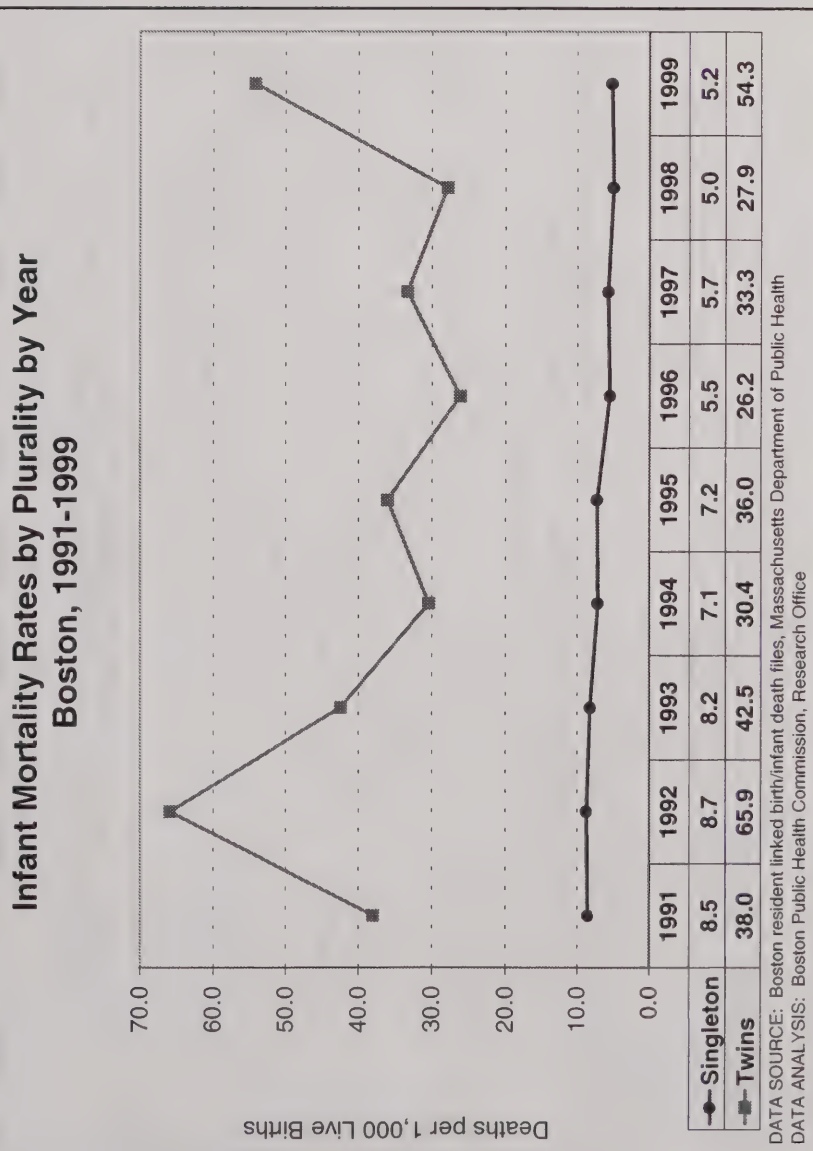


DATA SOURCE: Boston resident linked birth/infant death files, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- In 1992-1995 and 1996-1999, infants born to Boston women with at least some college education had IMRs of 5.9 deaths per 1,000 live births for each time period.
- IMRs were highest for infants born to women who were high school graduates with no college education (12.2 during 1992-1995 and 7.7 during 1996-1999).
- The differences in IMRs among all educational categories were not statistically significant for either 1992-1995 or 1996-1999.
- Between 1992-1995 and 1996-1999, the IMR for women with less than a high school education declined 40.7%, a change that was not statistically significant, and the IMR for women who have a high school diploma/GED declined 36.9%, a change that was statistically significant.

# INFANT MORTALITY

## Plurality

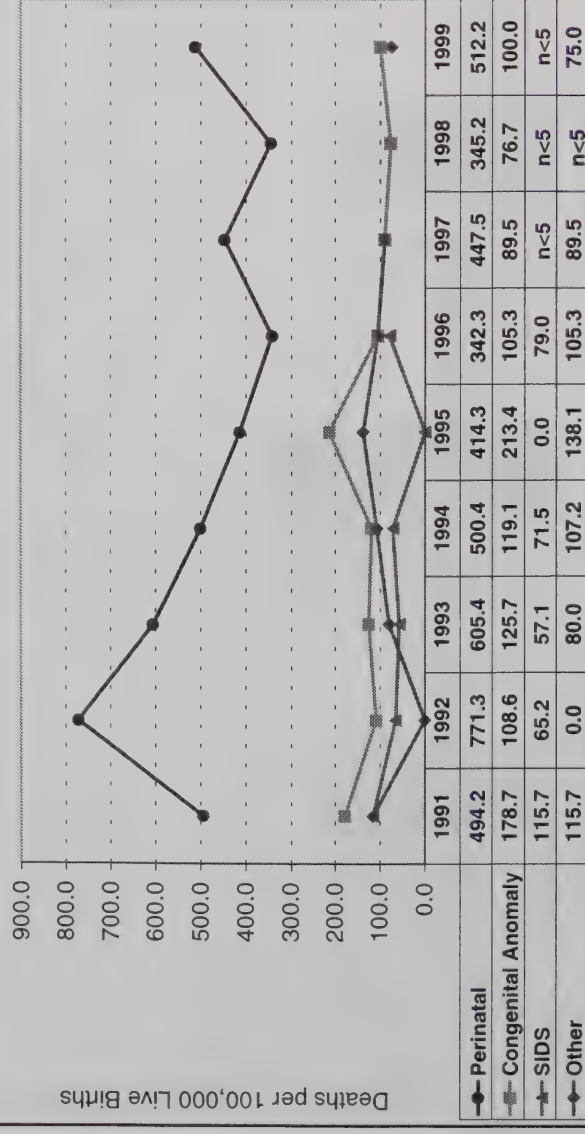


- During 1991-1999, for twin births, IMRs were five to ten times as high as the IMRs for singleton births. The highest IMR for both twin births and singleton births was in 1992.
- Between 1991 and 1999, IMRs decreased for singleton births but increased for twin births. The decrease for singletons was 38.8%, which was not statistically significant. The increase for twins was 42.9%, which was also not statistically significant.
- Although there were deaths among triplets in some of the years during 1991-1998, there were too few for the calculation of IMRs. There were fewer than 5 deaths among quadruplets in 1994 and no deaths in each of the remaining years.

# INFANT MORTALITY

## Cause of Death

Infant Mortality Rate by Cause of Death by Year  
Boston, 1991-1999



NOTE: Due to small numbers, rates are shown per 100,000 live births instead of per 1,000 live births to allow graphic depiction of differences.

DATA SOURCE: Boston resident linked birth/infant death files, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

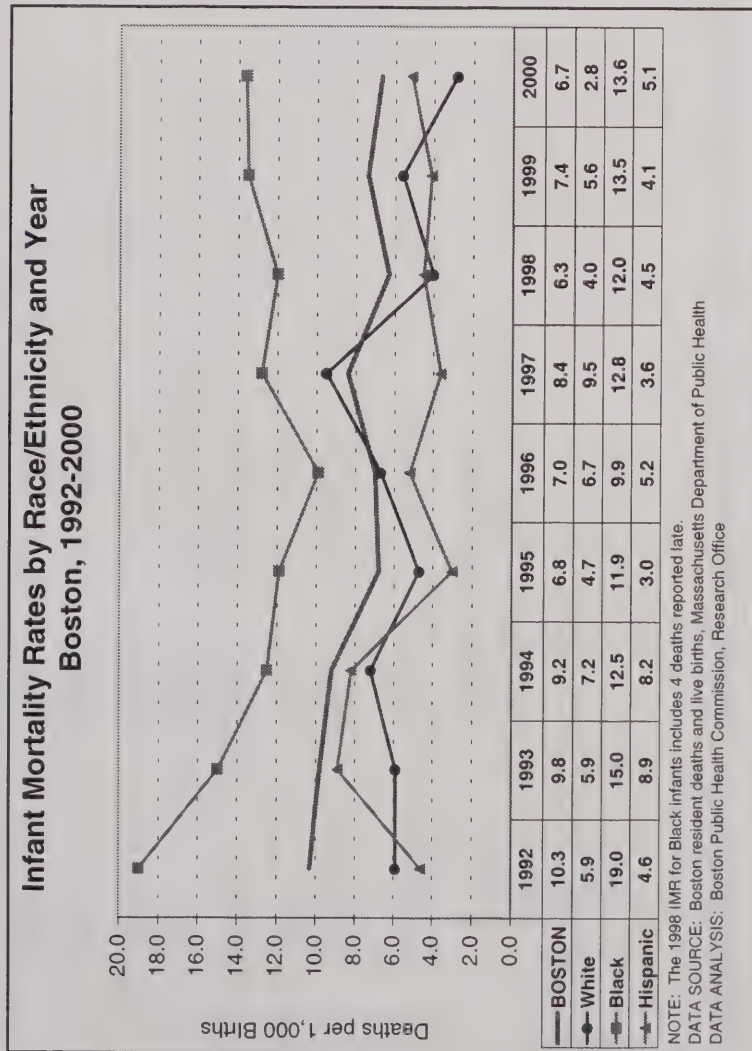
- Although IMRs for the leading causes of death fluctuated greatly during 1991-1999, IMRs were consistently highest for perinatal conditions, followed by congenital anomalies.
- Between 1991 and 1999, the IMR increased 3.6% for perinatal conditions but declined 44.0% for congenital anomalies, a decline that was not statistically significant. There were fewer than 5 SIDS deaths in 1997, 1998, and 1999, and no SIDS deaths in 1995. Between 1991 and 1996, the IMR due to SIDS declined 31.7%, but this decline was not statistically significant.



# INFANT MORTALITY

## Disparities in Infant Mortality by Race/Ethnicity

Disparities in IMRs among Boston's infants continue to exist, with Black infants continuing to have the highest IMRs among all race/ethnicity groups.



- In 2000, the Boston infant mortality rate (IMR) was 6.7 infant deaths per 1,000 live births, a 9.5% decrease compared with the 1999 IMR of 7.4. The decrease was not, however, statistically significant.
- The 2000 IMR for Black infants was 13.6 deaths per 1,000 live births, 28.4% lower than the high of 19.0 in 1992. Previously the Black IMR declined for four years (1993 to 1996), but this trend reversed in 1997. From 1997 to 2000, the IMR for Black infants increased 6.3% (this increase was not statistically significant). The 2000 Black IMR (13.6) was significantly higher than the Boston rate.
- The 2000 IMR for White infants (2.8 deaths per 1,000 live births) was a 52.5% decrease from the 1992 rate of 5.9 and the lowest rate during the nine-year period 1992-2000. However, this decrease was not statistically significant. The White IMR was 58.2% lower than the Boston IMR (this difference was also statistically significant).
- In 2000, the Hispanic IMR was 5.1 deaths per 1,000 live births, a 10.9% increase over 1992 (this increase was not statistically significant). The Hispanic IMR was 23.9% lower than the Boston IMR (this difference was not statistically significant).

## INFANT MORTALITY

### *Disparities in Infant Mortality by Race/Ethnicity*

**Infant Mortality Rates by Race  
Boston, 1990-2000**

YEAR	BLACK	WHITE	RATIO
1990	15.2	8.0	1.9
1991	12.6	7.2	1.8
1992	19.0	5.9	3.2
1993	15.0	5.9	2.5
1994	12.5	7.2	1.7
1995	11.9	4.7	2.5
1996	9.9	6.7	1.5
1997	12.8	9.5	1.3
1998	11.2	4.0	3.0
1999	13.5	5.6	2.4
2000	13.6	2.8	4.9

NOTE: Because some 1998 death data were reported late, the 1998 IMR for Black infants, given in previous reports, has been revised.  
DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- The gap between the infant mortality rates (IMRs) for White and Black Boston residents widened in 2000 to almost five Black infants deaths for every White one. This gap at its narrowest was 1.3, in 1997.
- However, in 1998, the gap between the Black IMR and the White IMR once again widened. The Black IMR (11.2) was three times the White IMR (4.0).
- Between 1998 and 1999, the gap slightly improved, with the Black IMR 2.4 times the White IMR. This improvement may be attributed to an increase in the White IMR.

INFANT MORTALITY

Disparities in Infant Mortality by Race/Ethnicity

Birthweight-Specific Mortality Rates\*  
By Race/Ethnicity  
Boston, 1995-1999

	<500 Grams	500-999 Grams	1,000-2,499 Grams	2,500+ Grams
White	866.7	313.4	17.7	1.4
Black	918.4	231.2	15.1	2.2
Hispanic	769.2	267.9	12.0	1.6

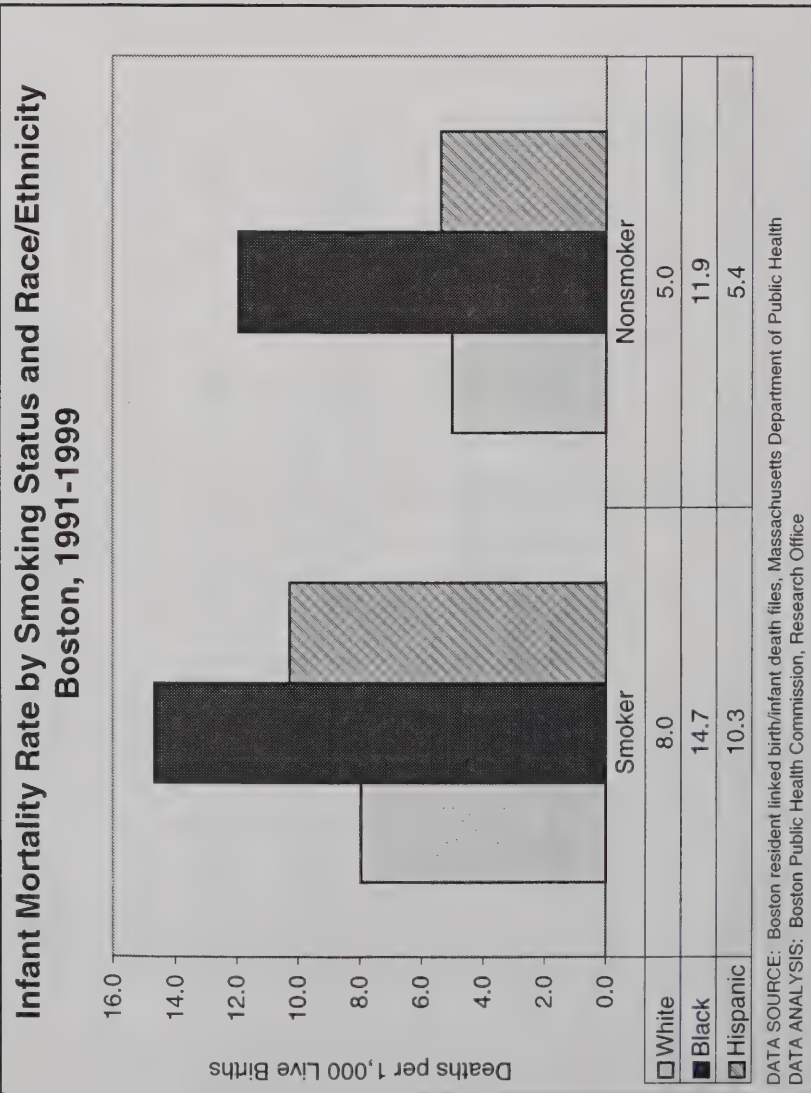
\*Deaths per 1,000 live births in that weight range  
DATA SOURCE: Boston resident linked birth/infant death files, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- A much higher proportion of very small infants (those born weighing less than 500 grams) die than those in other birthweight categories.
- Birthweight-specific mortality rates are similar across race/ethnicity groups. For 1995-1999, there were no statistically significant differences between the mortality rates of the racial/ethnic groups in any of the birthweight categories shown at left.
- Among Boston infants during 1995-1999, Black infants accounted for 61.3% of the extremely low birthweight births (a birthweight less than 500 grams) and about the same percentage (65.2%) of the deaths among extremely low birthweight infants.



## INFANT MORTALITY

### *Disparities in Infant Mortality by Race/Ethnicity*



- During 1991-1999, IMRs were higher for infants of any race/ethnicity when mothers reported smoking during pregnancy. The IMR was higher for Black infants whose mother smoked than for White and Hispanic infants of smokers. These differences were statistically significant.
- IMRs were highest for infants of Black mothers irrespective of the smoking status of the mothers.

# INFANT MORTALITY

Cumulative Birthweight Distribution <2,500g Boston, 1996-2000						
	<500g	<750g	<1,000g	<1,500g	<2,000g	<2,500g
White	0.1%	0.4%	0.6%	1.0%	2.4%	6.4%
Black	0.4%	1.3%	1.9%	3.4%	5.8%	12.7%
Hispanic	0.2%	0.4%	0.8%	1.5%	3.3%	7.9%
Asian	0.1%	0.2%	0.4%	0.7%	2.1%	6.7%
Other	0.2%	0.6%	0.7%	1.7%	3.5%	8.0%

DATA SOURCE: Boston resident live birth file, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission, Research Office

- Mortality is highest among births in the lowest-weight categories. The fact that a much higher proportion of Black infants are born at these weights largely accounts for the excess infant mortality experienced by Black Boston infants.
- The percentage of Black births in each birthweight category under 2,500 grams was significantly higher than the percentages for the other racial/ethnic groups, except in the under 500 grams category.
- If the weight distribution of Black births among Boston residents in 2000 had been the same as that of White residents, the expected number of infant deaths would have been 13 rather than the actual 34 that occurred.

## Healthy People 2010 Objectives

### Selected Maternal and Infant Health Indicators

OBJECTIVE		HP 2010 TARGET
<b>Prenatal Care</b>		
Care beginning in first trimester		90% of births
<b>Risk Factors</b>		
Low Birthweight (LBW)		no more than 5% of births
by Race/Ethnicity:		
White, non-Hispanic		no more than 6.5% of births
Black, non-Hispanic		no more than 13.1% of births
Hispanic		no more than 6.4% of births
Asian		no more than 7.2% of births
Very Low Birthweight (VLBW)		no more than 0.9% of births
Preterm*		no more than 7.6% of births
by Race/Ethnicity:		
White, non-Hispanic		no more than 9.9% of births
Black, non-Hispanic		no more than 17.6% of births
Hispanic		no more than 11.2% of births
Asian		no more than 10.2% of births
<b>Infant Deaths</b>		
Infant Mortality Rate		no more than 4.5 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 6.0 deaths per 1,000 births
Black, non-Hispanic		no more than 13.7 deaths per 1,000 births
Hispanic		no more than 6.0 deaths per 1,000 births
Asian		no more than 5.0 deaths per 1,000 births
Neonatal Mortality Rate		no more than 2.9 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 3.9 deaths per 1,000 births
Black, non-Hispanic		no more than 9.4 deaths per 1,000 births
Hispanic		no more than 4.0 deaths per 1,000 births
Asian		no more than 3.2 deaths per 1,000 births
Postneonatal Mortality Rate		no more than 1.5 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 2.1 deaths per 1,000 births
Black, non-Hispanic		no more than 4.5 deaths per 1,000 births
Hispanic		no more than 2.0 deaths per 1,000 births
Asian		no more than 1.8 deaths per 1,000 births

\*Born before completion of 37 weeks gestation

Note: Asian includes Pacific Islanders.

DATA SOURCE: Available at <http://wonder.cdc.gov/DATA2010/OD16.HTM>. Accessed November 1, 2002.



## TECHNICAL NOTES

Technical Notes provide explanations of many of the terms, concepts, and sources used in *Boston Natality 2002: A Review of 2000 Birth Data*. Many of these subjects are also covered in the glossary. Readers can call the Boston Public Health Commission's Research Office at (617) 534-4757 for more information on any of the subjects addressed here or with other questions about the report.

### Rates

Two types of rates have been included in *Boston Natality 2002: A Review of 2000 Birth Data*. They are *Age-Specific Rates (ASR)* and *Infant Mortality Rates (IMR)*.

*Age-Specific Rates (ASRs)* take into account the size and age distribution of the population. They enable the reader to compare different groups without being concerned that differences in health status of those groups are due to differences in the size of the groups or in distribution of ages. An ASR is calculated by dividing the number of events among people in an age group by the number of people in that age group. ASRs for birth-related rates are calculated for every 1,000 women in any age group. In this report, race/ethnicity specific ASRs are also presented.

*Example:* The Boston ASR for births in 2000 was higher in women ages 25-34 (68.2 births to women ages 25-34 per 1,000 women ages 25-34) than among women ages 15-19 (35.3 births to women ages 15-19 per 1,000 women ages 15-19).

*Infant Mortality Rates (IMRs)* are used as a measure of infant deaths within a population. However, unlike mortality rates for adults or children one year of age and over, which are usually calculated for every 100,000 persons, IMRs are calculated for every 1,000 live births.

### Statistical Significance

An array of statistical tools are available to determine whether findings, typically differences observed between groups or within a group over a period of time, are large enough that they are not likely to have been due to chance. Essentially, statistical significance testing provides an assessment of how reasonable it would be to conclude that an observed difference is real. It is not capable of overcoming other issues such as noncomparable samples or too few cases in a sample, but is a valuable guide to the interpretation of rates, proportions, and similar measures.

Statistical significance is only one measure of significance. There may be findings that have other important relevance clinically or for public health programs, regardless of statistical significance. An absence of statistical significance should not be used to imply an absence of other significance or to lessen the importance of any particular health care problem affecting Boston residents.

In this edition of *Boston Natality*, 95% confidence intervals are used to assess the statistical significance of findings.

## Logistic Regression

Logistic regression is a statistical technique that assesses the impact of several qualities of a population group at the same time. The goal of logistic regression analysis is to design a mathematical model that can predict a particular outcome such as low birthweight or the adequacy of prenatal care, known as the dependent variable. In order to do so, this model must take into account factors that may affect the possibility that this outcome may occur. These factors are called independent variables and can include biological, environmental, or social elements. A successful logistic regression model will include any relevant factors and be able to predict which members of the population are likely to have the outcome of interest.

To indicate how greatly a factor predicts the outcome, a number, called the coefficient, is calculated to represent the relative strength of that relationship. A logistic regression equation integrates relationships like these into a model that includes many variables and their coefficients.

NOTE: In these analyses, race and ethnicity are investigated as contributing factors to certain outcomes. See elsewhere in the Technical Notes for discussion of the use and meaning of racial and ethnic designations in this report.

## Time Periods and Small Numbers of Health-Related Events

This report contains data drawn from the period 1990 through 2000, 1991 through 2000, and 1992 through 2000. In general, Boston-specific data are presented for the nine-year time span of 1992 through 2000, either year by year or for 2000 only.

Determination of the time period to be used depends largely on the availability and adequacy of the data. In analyzing subgroups within the Boston population there must be a sufficient number of events, such as deaths or births, within the time period to provide reliable rates. While what is defined as a "small" number can vary, the BPHC Research Office adheres to the widespread practice of not calculating rates for fewer than five deaths, births, or other health events.

## Population

Health status reports often use population statistics for analyzing health data. These population statistics may be drawn from two sources. The first is the census of the population taken every ten years by the federal government, a literal count of all people living in the United States. The second is estimates of the population made by the US Census Bureau or some other source in the intervening years.

Each source has its own advantages, and there are distinct reasons for choosing each one. The census provides the best available actual count of the population. Another important strength of the census is that it presents data to the level of small areas called census tracts, each of which has only a few thousand residents. Census tracts can be combined to produce neighborhood-level analyses.

However, while the 1990 census was the best estimate of the population for the early 1990s, with each passing year it becomes more remote from the population it was intended to represent. Changes in the population in the years following the census cannot be taken into account when using old census data, so this report utilizes population estimates. In this report the 2000 census population for Boston as well as population estimates for the years between the censuses have been used.

Population projections, or estimates, of the population, are developed by the Census Bureau and other institutions using sophisticated statistical methods. The results are designed to take into account in- and out-migration and other changes occurring in the population between census years. And yet, for the purposes of this report, estimates of population



changes between census years have some drawbacks. They do not typically account for changes in the racial composition of a community, and they do not generally permit neighborhood-level analyses. Perhaps most importantly, even small errors in the accuracy of projections for neighborhoods or other population subgroups can result in large distortions in their rates.

To provide data on people of Hispanic ethnicity, who may be of any race, this report uses the 2000 US census for Boston census tracts, produced by the Bureau of the Census, and MISER and Massachusetts Department of Public Health population estimates, for denominators for rate calculations that require population data. This avoids the double-counting which would result if Hispanics were included in the White, Black, and Asian racial categories as well as in the Hispanic categories. However, for hospitalization data, Hispanics may be reported in the White, Black, Hispanic or Asian category, depending on the individual hospital's reporting practice. Hospitalization rate calculations by race/ethnicity that require population data for denominators may consequently be affected by these inconsistencies in reporting.

## Population Estimates

Population estimates were used in calculating all crude and age-specific rates included for years between the 1990 and 2000 US censuses. Two sources of population estimates for Boston were used, the population estimates from the Massachusetts Institute for Social and Economic Research (MISER) for 1991-1998 and those from the Massachusetts Department of Public Health for 1999.

## Massachusetts Department of Public Health 1999 Boston Population Preliminary Estimate

MDPH used linear interpolation between the 1998 Massachusetts Institute for Social and Economic Research (MISER) population estimates and the MDPH 2000 population estimates to create 1999 population estimates. The Massachusetts Department of Public Health considers the Population 1999 file to be a draft estimate and should be interpreted with caution.

The MDPH Population 2000 file is a draft estimate as well. It is based upon the Massachusetts US Census file, which contains data on population and housing for the 351 towns, the state, and county records for Massachusetts abstracted from the *Census 2000 SF1* file (US Census, 2001).

## Neighborhoods

Census tracts are so small that there are often not a sufficient number of health-related events—such as births or deaths—to calculate reliable rates, particularly for individual years. Therefore, census tracts are combined into neighborhoods for the presentation of the natality data.

Some of Boston's neighborhoods are clearly defined. West Roxbury, for example, is bordered by the West Roxbury Parkway, the Stony Brook Reservation, and Dedham. The boundaries of most neighborhoods are less distinct for historical, political, or geographic reasons.

A goal for this report was to select geographic areas that were small enough to show the variation of health patterns throughout the city while being large enough to be statistically reliable. Neighborhood definitions were discussed with residents, health care providers, and advocates throughout Boston. The definitions that are in this report are the result of that consultative process and are the same definitions used in *The Health of Boston* and other BPHC reports.



## Racial and Ethnic Designations

National, state, and local health data sources usually make available data for only a few large racial and ethnic groups, and the classifications they use are not always consistent with other sources; caution should be used in comparing racial and ethnic data from different sources. The categories used in *Nativity 2002: A Review of 2000 Birth Data* are non-Hispanic White ("White"), non-Hispanic Black ("Black"), Asian/Pacific Islander ("Asian"), and Hispanic. These racial and ethnic designations are derived from the source of the data, including the US census, birth and death data from the Massachusetts Department of Public Health, and other sources. All data used in this report except those taken from death certificates are self-reported.

The collection of racial and ethnic data varies with the data source. Some sources may rely on observation and others on self-reporting. Race and ethnicity on a death certificate are reported by the funeral director based on information provided by a relative or friend if available, while birth certificates may combine information reported by the mother, father, or other relatives.

In considering the racial or ethnic designations used in this report for Boston-specific data, several things should be kept in mind: (1) The concept of race has different meanings in different cultures. (2) Race is not a biological but a social phenomenon. (3) The meanings of racial designations—White, Black, Asian/Pacific Islander—are subject to historical, cultural, and political forces. (4) Finally, racial designations are notably inaccurate in describing what they are called upon to describe. The term Black, for example, includes a variety of people who would describe themselves as African-American, African, Caribbean, or Haitian.

In the charts which present data by race and ethnicity or in the text which discusses health problems among racial and ethnic populations, it should be kept in mind that, as the CDC has said, "race and ethnicity are not risk factors [for disease]—they are markers used to better understand risk factors." Race is often a proxy for such factors as socioeconomic status, inadequate access to health care, and racial discrimination. Information on race and ethnicity is included in this report because it can assist public health efforts to recognize disparities between groups for a variety of health outcomes.

Boston-specific data in this report are generally presented for each racial and ethnic subgroup when data are available and numbers are large enough to allow calculation of percentages or reliable rates. Many charts may present data only for the largest racial and ethnic groups, such as non-Hispanic Whites, non-Hispanic Blacks, and Hispanics. Few sources provide data in large enough numbers for smaller groups such as the many ethnicities included in the category "Asian."

Since Hispanics can be of any race, the federal and state data sources often report data for Blacks and Whites, including Hispanics in those categories. However, the Boston-specific data in the charts and discussion provided in *Boston Natality 2002: A Review of 2000 Birth Data* reports data for four separate groups—Hispanics, non-Hispanic Blacks, non-Hispanic Whites, and Asians.

## Prenatal Care

### *Kessner Index*

Prenatal care is medical care specifically associated with pregnancy, the goal of which is a healthy birth process and outcome for both the fetus and the mother. One of the most common measures of prenatal care is the Adequacy of Prenatal Care Scale (based on the Kessner Index), in which prenatal care is classified into five categories (adequate,

intermediate, inadequate, no prenatal care, and unknown) based upon the trimester in which prenatal care began and the number of prenatal visits. The general classification scheme is as follows:

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
Inadequate	1	1-4
	2	1-4
	3	1 or more
No Prenatal Care	none or unknown	none or unknown

## GLOSSARY

**Accidents and Adverse Effects:** Effects that include motor-vehicle-related injuries but that exclude homicides and suicides. ICD-9 CM codes include E800.0-E949.9; ICD-10 codes include V01-X59, Y85-Y86.

**Adolescent Births:** Births to women who are between 10 and 19 years of age.

**African-American:** All persons identified as being born in the US who have ancestors of African descent. Racial or ethnic designations from all sources used in this report except death certificates are self-reported.

**Age-Specific Birth Rate:** The number of births per year in a given age group per 1,000 women in that age group.

**Asian:** All persons identified as Asian or Pacific Islander (e.g., Chinese, Japanese, Hawaiians, Cambodians, Vietnamese, Asian Indians, Filipinos) who do not identify themselves as Hispanic. Racial or ethnic designations from all sources used in this report except death certificates are self-reported.

**Birth:** All births reported in *Boston Natality 2002: A Review of 2000 Birth data* are live births. **See Live Births.**

**Birth Rate:** The number of live births per year, per 1,000 persons.

**Birthweight:** The weight of an infant at the time of delivery. It may be recorded in either grams or pounds/ounces. If recorded in pounds/ounces, it is converted to grams for use in this report based on the following formula: 1 pound = 453.6 grams; 1,000 grams = 2 pounds and 3 ounces.

**Black:** All persons identified as Black (e.g., African Americans, Haitians, West Indians) who do not identify themselves as Hispanic. (See Non-Hispanic Black.) All racial and ethnic designations from all sources except birth and death certificates are self-reported.

**Cesarean Section:** The delivery of the fetus by an incision through the abdomen into the uterus. Often this procedure is done as a result of pregnancy-related complication such as the fetus being too large for the maternal pelvis. Breech presentations are also often handled by cesarean section.

**Confidence Interval:** The range within which lies the true value of a variable, based on a chosen probability. For example, given the probability 95%, one can be ninety-five percent certain that the true value lies between numbers X and Y. The range between X and Y is the confidence interval.

**Congenital Anomaly:** A structural abnormality present at birth; ICD-9-CM codes 740.0-759.9; ICD-10 codes Q00-Q99.

**Crude Birth Rate:** The number of live births per year, per 1,000 persons.

**Demographics:** The statistical study of characteristics of human populations and of population distributions such as age, sex, and race/ethnicity.

**Embryo:** The product of conception from fertilization through the eighth week of development (approximately the tenth week of pregnancy), after which it is referred to as a fetus.



**Fertility Treatment:** A variety of procedures and/or medications used with the purpose of enhancing the likelihood of conception.

**Fertility:** The capacity to become pregnant.

**Fetus:** The term used from the end of the eighth week after fertilization to the moment of birth.

**Forceps:** An instrument used to grasp the fetal head as an aid in delivery; the delivery of an infant using such an instrument.

**Gestation:** The period of fetal growth in the uterus during pregnancy.

**Gestational Age:** Length of pregnancy (in weeks) calculated as the number of weeks following the woman's last menstrual period. A normal pregnancy is approximately 40 weeks in length.

**Hispanic:** Includes people of any race (Asian, Black, White, or Other) who consider themselves Hispanic or Latino, such as Puerto Rican, Mexican, Cuban, Spanish, and Dominican. All racial or ethnic designations from all sources except birth and death certificates are self-reported.

**Homicide:** A death intentionally caused by a person other than the deceased. ICD-9CM codes E960.0-E969.9; ICD-10 codes X85-Y09, Y87.1.

**Infant Mortality Rate (IMR):** The number of deaths per 1,000 live births among infants less than one year old.

**Kessner Index:** See **Prenatal Care** in Technical Notes

**LBW:** See **Low Birthweight**.

**Live Birth:** Any infant who breathes or shows any other evidence of life (such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles) after separation from the mother's uterus, regardless of the duration of gestation.

**Logistic Regression:** A statistical analysis technique used to identify associations between independent variables, such as race or sex, and a selected dependent variable, such as infant death.

**Low Birthweight (LBW):** Weight of an infant at time of delivery of less than 2,500 grams (5.5 pounds).

**Miscarriage:** The spontaneous expulsion of embryo or fetus before 20 completed weeks' gestation.

**Morbidity:** Illness, disease, or injury.

**Mortality:** The relative frequency of deaths in a specific time period; death rate.

**Multiple Births:** The birth of two or more offspring from the same pregnancy.

**Neonatal Deaths:** Deaths of infants under 28 days old.

**Neonatal Mortality Rate:** The number of neonatal deaths per 1,000 live births.

**Non-Hispanic Black:** All persons identified as Black (e.g., African Americans, Haitians, West Indians) and not identified as Hispanic. All racial or ethnic designations from all sources except death certificates are self-reported.

**Non-Hispanic White:** All persons identified as White and not Hispanic. All racial or ethnic designations from all sources except death certificates are self-reported.

**Odds Ratio:** A number that represents the likelihood of one group having an existing characteristic or an event occur in comparison to another group. An odds ratio of 4, for example, means that a particular group (for example, persons who smoke) is four times more likely to experience a certain condition (for example, cancer) than a group with which it is compared (persons who don't smoke).

**Other Race:** People identified as a race other than Black, White, or Asian (e.g., American Indian/Native American, Aleut, Eskimo) and not Hispanic. All racial or ethnic designations from all sources except death certificates are self-reported.

**Parity:** The number of previous live births to a woman plus the current birth.

**Perinatal:** Occurring during or pertaining to the periods before, during, or after the time of birth (i.e., before delivery from the 28th week of gestation through the first seven days after delivery).

**Perinatal conditions:** Certain conditions originating in the perinatal period. Examples of such conditions include: birth trauma, disorders related to short gestation and low birthweight, disorders related to long gestation and high birthweight, respiratory and cardiovascular disorders or infections specific to the perinatal period. ICD-10 codes P00-P96.

**Plurality:** The number of births to a woman from the same pregnancy: singleton is the birth of one infant, twins is the birth of two infants, triplets is the birth of three infants, etc.

**Postneonatal Deaths:** The number of infants dying at 28 through 364 days of age.

**Postneonatal Mortality Rate:** The number of postneonatal deaths per 1,000 live births.

**Pregnancy:** The condition of carrying a developing embryo or fetus in the uterus.

**Prenatal Care (PNC):** See **Prenatal Care** in Technical Notes

**Preterm Birth:** Birth before 37 completed weeks gestation.

**Private Insurance:** Health insurance not paid for by public funds. Types of private insurance include health maintenance organizations (HMOs), Blue Cross/Blue Shield, and commercial insurers.

**Public Insurance:** Health insurance paid for by public funds. This includes Medicaid, the state Healthy Start program, other types of governmental programs, and the Uncompensated Care Fund.

**Race, Other:** See **Other Race**

**SIDS:** See **Sudden Infant Death Syndrome**.

**Singleton:** A pregnancy consisting of a single infant, or such an infant.

**Socioeconomics:** Social and economic characteristics of a population, such as education and poverty levels.

**Sudden Infant Death Syndrome (SIDS):** The unexpected and unexplained death of an apparently well infant, often occurring during sleep. SIDS is the most common cause of infant death between the second week and the end of the first year of life and occurs most frequently in the third and fourth months of life, in premature infants, in males, and in African-American infants. ICD-9-CM code 798.0; ICD-10 code R95.

**Term:** Birth at a gestational age of 37 or more completed weeks.

**Trimester:** A period of three months.

**First trimester:** The first three months of pregnancy.

**Second trimester:** The middle three months of pregnancy (four to six months).

**Third trimester:** The final three months of pregnancy (seven to nine months).

**Triplet:** One of three infants from the same pregnancy.

**Twin:** One of two infants from the same pregnancy.

**United States:** For the purposes of this report, the US comprises the fifty states only; US territories are considered separately.

**Vacuum Extraction:** The delivery of an infant by the use of an instrument designed to apply suction to the head of the fetus.

**Vaginal Birth:** The delivery of an infant through the birth canal.

**Very Low Birthweight (VLBW):** Weight of an infant at time of delivery of less than 1,500 grams (3.3 pounds).

**Weight gain:** The total weight in pounds that a woman gains during her pregnancy. The current general guidelines recommend that a woman of normal weight and average height gain no less than 15 pounds and no more than 40 pounds.

**White:** All persons identified as White who do not identify themselves as Hispanic. (See non-Hispanic White.) All racial or ethnic designations from all sources except death certificates are self-reported.















